A new Fiscal and Social Security System

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Abstract

This work intends to propose a new form to finance social security expenses using VAT in order to decrease the compliance and administrative costs of paying taxes, to increase the sustainability of social security systems reducing his dependence on labour taxes, to decrease formal economy and to create an individual social account, that is financed by a direct tax on the personal labour income and through the declared consumption and saving. The social account aims to finance hardships like unemployment, sickness and old-age. This proposal involves the maintenance of the actual labour costs but the elimination of personal income taxes and taxing individuals when they consume and save, stimulating the declaration of individual income by returning a part of the tax through a credit on the individual social account, which could reduce informal economy and increase the sustainability of social expenses.

Key-words: VAT, Social Security, Tax, Informal

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Biographical introduction of the author

I, José Manuel Tavares Ferreira Alves, was born in Vila nova de Gaia, Portugal on November 02, 1981.

In the year 2013, I became a holder of a Bachelor's degree in Business Administration (three-year program) from School of Economics and Management of the University of Porto. During my graduation I was a call center assistant at RH+ – Organização e Gestão de Recursos Humanos S.A., position that i started in 2001 and only left in 2015, before from 1998 to 2001 I was an interviewer at Marktest - Marketing, Organização e Formação, Lda..

After concluding my first semester of second year of the Master of Finance I moved to Slovakia due to a professional proposal from IBM - International Services Centre s.r.o., where at the moment I have a position of Financial Analyst.

This career move was only possible due to my Bachelor and Master attendance. Making my choice to choose the School of Economics and Management of the University of Porto to pursue my dream of having a career in finance was the correct one.

I always had an interest in tax and social security systems due to their importance to all of us, so I took the opportunity to produce a dissertation to expose my proposals to change the current systems. I really hope you like to read this document as I had making it.

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1 Introduction

According to United Nations (2013) in 2060 for each 100 persons between 15 and 64 years old, there will exist 28 that have more than 65 years old (from 8.5 in 1950, but if we look to Europe that number increases to 50, in Japan it reaches 73, the world population is ageing (for 2010 the numbers were 11.6, 23.8 and 35.1, for the World, Europe and Japan respectively). On top of that total fertility rates in OECD countries have declined dramatically over the past few decades, falling on average from 2.7 in 1970 to 1.7 children per woman of childbearing age in the 2000s. The total fertility rate is below its replacement level of 2.1 in most OECD countries (OECD (2014a)).

Ageing population and reduction of fertility rate are the main reasons for the expected increase on spending of the current social security systems, of which the majority have a pay-as-go system (PAYG) (OECD (2013a)). This means that benefits paid to retirees are contributed by workers paying into the system. The consequences of an increasing dependency ratio (less people contributing to current PAYG systems and more people receiving benefits) put pressure on public accounts.

Countries could counter this if they (i) *have healthier public finances* or if (ii) *people were saving enough for retirement* or if (iii) *social security systems were sustainable.*

Regarding the first option, if public finances generated surplus to face the expected increasing spending for social security systems, this problem could be mitigated but public finances for OECD and EU countries are not helping to counter the pressure from the public expenditure on cash benefits for old-age. The net debt interest payments will represent 1.8% and 2.1% of the GDP in all OECD and EU countries in 2016, respectively[1]. Public net debt is expected to reach 72% of the GDP in all OECD and EU countries in 2016 while in 2014 those values were of 71% and 68%[2], respectively.

Other option to mitigate the pressure from public expenditure on cash benefits for old-age and a survivor increase would be personal saving, but it seems we are not saving enough. Household saving rates are on average for the Euro Area of 7%[3], while Antolin (2009) says that people need to put aside 15% of their wages during their working life to achieve an adequate level of retirement income (assuming a target replacement rate of 70%, 40 years of working life and a return of 6%.With the same assumptions but with a 5% level of saving we reach a 25.3% replacement rate).

[1] Data obtained through the OECD website, address http://www.oecd.org/eco/outlook/economicoutlookannextables.htm
[2] *Id*.,at 1
[3] *Id*.,at 1

Saving is also difficult for most of us, because it requires self-control (Choi et al. (2004)) demonstrate how we general lack self-control) and procrastination should be avoided (e.g. O'Donoghue and Rabin (1999) shown we usually procrastinate). There is considerable evidence that people display time-inconsistent behavior, specifically, weighting current and near term consumption especially heavily[4], which could lead us to under save for retirement.

The last option is having a more sustainable social security system, but it seems that is also not happening. Between 1990 and 2009 the public expenditure on cash benefits for old-age and a survivor increased 27%, reaching on average 7.8% of the GDP and 16.6% of the government spending in OECD countries and is expected to reach 11.7% of GDP in 2050 (OECD (2014c)), where the main driver of this increase is the dependency ratio. In terms of future responsibilities, according to Mink (2008) the estimated implicit pension obligation, yields a burden for the euro area of 174% of GDP in 2005.

OECD countries have being facing the same problem, how to ensure that pension systems are financially sustainable and how to give citizens an adequate income in retirement, while ensuring that the costs of pension provision do not become too high for the next generations in the context of population ageing?

At present most countries finance mainly their social expenses (programs that insure individual's and their relatives against interruption or loss of earnings power and for certain expenses) through taxes on labor (OECD (2013a)), including both payroll taxes that finance contributory social security regimes and other taxes on wages and labour income that finance a broader array of social programs.

The tax wedge on labor[5] in 2013 was on average 35.9%. But countries also finance these expenditures through general taxation, using for example the VAT[6] (Value Added Tax), despite the raising contribution from private pension funds and other financial sources, like housing (e.g. equity release schemes) (OECD (2013a)). We need also to take into account the effect the of tax burden on labor on the level of employment, Blumkin et al. (2012) present evidence that subjects reduce less reduce their labor supply when a consumption is introduced compared to an equivalent direct tax.

A key question is whether it should continue to be financed primarily or exclusively through taxes on labor, or whether efficiency would be enhanced by shifting reliance

[4] To see how this is consistent with how our brain works, see McClure, Laibson et al. (2004)

[5] Picos-Sánchez (2011) analyzed the effect of indirect taxes on tax wedge of households compared with OECD (2014b)

[6] To see how the VAT works and to have a historical view see chapter 1 in OECD (2014d)

to general revenues of government and potentially to other tax bases, of which the VAT is the most obvious candidate, as one of the potential fiscal revenue enhancements. VAT seems to have space for improve its efficiency, using VAT Revenue Ratio (VRR), Barbone et al. (2013) estimated an average VRR Gap for the EU-27 (from 2000 until 2011) of 47% and a the interpretation of these results is that an important amount of revenue loss during the period 2000-2011 stemmed (in most countries) from choices made over time that have introduced and sometimes extended multiple rates and exemptions.

In order to Levy (2010) and others (e.g. Keen (2008)) have argued that current SSC (Social Security Contributions) in payroll tax systems, together with non-contributory benefit programs available to workers in the informal sector, constitute a subsidy to the informal sector which suppresses development of the formal sector and results in productivity losses. To remove this bias, Levy (2010) has proposed financing SSC from the VAT instead of through contributory payroll taxes. Thomas and Picos-Sánchez (2012) that point out the need to careful calibrate this change. Shifting part of the funding of social expenditure from SSC to consumption taxes has been proposed in a number of countries and was implemented in Germany in 2007 (where a 1.15 percentage point reduction in both employee and employer unemployment insurance rates was fully funded by an increase in the standard VAT rate), and in Hungary in 2009 (where a five percentage point reduction in the employer SSC rate was fully funded by an increase in the standard VAT rate).

Other source of potential fiscal revenue enhancement is the reduction of the shadow economy, its size in Europe reached a 10 year low in 2013 and is estimated to represent 18.5% of economic activity across Europe, reaching a value of €2.15 trillion[7](Schneider (2013)).To see the its importance for public accounts, in Portugal, Afonso (2014) estimated that informal economy reached a value of 26,81% in 2012, if this value was 0% and using a 20% overall tax burden the fiscal deficit would be for 2012 of 0.85% instead of 6.43%.

The above proposals raise an old discussion[8], should we finance public expenses through direct or indirect taxation or should we use a mix of booth.

As we have seen, the population is ageing, the total fertility rate is below its replacement level of 2.1 in most OECD countries, they are facing financial constraints due to the increase of pension spending and future responsibilities

[7] Edgar L. Feige (2007) and Frank A. Cowell (1981) provides an excellent window into the research about evasion .To check the efforts made from OECD countries to counteract evasion see OECD (2013b).

[8] Since Hobbes (1651) and continuing with Mill (1871), the question of whether to tax consumption or income arises repeatedly in tax policy debate.

(besides the weight of interest), and one of the major goals of OECD countries is to tackle these problems, our proposal don't intend to be a panacea for all of them, but to constitute one more solution, next we present an general overview of it.

1.1 Our proposal

Our proposal consists on financing the social expenses through a consumption tax and from an employee contribution, while maintaining the same level of nominal labor costs and eliminating the personal income tax, in our best knowledge it cannot be found in the present literature. Basically in this system we only pay direct taxes and part of them finances an individual social security account.

Our goal is to present a model that will try to answer to following questions:

a) It is possible to eliminate income taxes and maintain the same level of tax revenue?
b) It is possible to eliminate or reduce the "underground" economy?
c) It possible to have an individual social security account that provides an adequate income when necessary?

We will try to achieve the answer to previous questions using data from INE (Instituto Nacional de Estatistica), in order to obtain data from available income and household consumption. Then we will simulate our model using the previous data for the Portuguese case, but our proposal can be applied to any country and check if the results give a positive or negative answer to our questions.

1.2 Structure

In here we will present our proposed structure, so besides this section; this report is going to be structured as follows: in Section 2, a literature review of the topic is made. In section 2.1, are presented and the main papers about the financing social expenditures trough indirect taxation and also the discussion about indirect and direct taxation, in section 2.2, we will present a summary of all the relevant literature.

In section 3 we present an overview of taxation. In section 3.1 we will present an historical evolution of tax ratios, in section 3.2, we will analyze the tax structure in the majority of the countries, addressing taxes on income and profits, social security

contributions, property taxes and consumption taxes. In section 3.3 we will address the differences, pros and cons between direct and indirect taxation.

In section 4 we will analyze the different social security systems around the world, in section 4.1 we will address the design of pension systems and in section 4.2 we address the current situation of Social Security Systems in OECD, in section 4.3 will post some of the recent developments in social security systems according to the OECD publication, *Pensions at a Glance.* In section 4.4 we will analyze contingent liabilities in pension systems and some suggestions for the transition from an unfunded to a funded pension system.

In section 5 will present our proposal in a more complete form, using the referred literature. In section 5.1 we will address the transition between the current system and our proposal. In section 5.2 we will put to test our theory using official from Portugal and using some scenarios for different levels of informal economy.

In section 6 will present the conclusions from this paper.

2 Literature Review

The value added tax (VAT) has displace many different trade sales, and manufacturing taxes in the past half century, becoming a major source of government revenue for an increasing number of countries. The tax has all the desirable non-distortionary theoretical properties of a sales tax, its incidence ultimately falling on consumers, but it is much harder to avoid, as the tax is collected most of the time in intermediate steps during the production of a finished retail good rather than at the final sale. As a result, it has proven incredibly popular as it can collect a great deal of revenue (Toder and Rosenberg (2010) and Keen and Lockwood (2010)).

According to OECD (2014e) VAT become the largest source of taxes from general consumption, accounting on average for 6.6% of GDP and 19.5% of total revenue in OECD countries in 2012. While this tax is theoretically less distorting than other taxes for each monetary unit of revenue collected, there is limited analysis regarding its overall impact on the economy, Ufier (2014) analyzed the effects of VAT in 192 countries in over two decades and he found that VAT adoption is associated with an increase in growth and investment as well as lower inflation and government spending as a share of GDP, Ormaechea and Yoo (2012) considered a sample of 69 countries using observations from 1970 until 2009, found among income taxes, social security contributions and personal income taxes have a stronger negative association with growth than corporate income taxes, a shift from income taxes to property taxes has a strong positive association with growth, and a reduction in income taxes while increasing value added (VAT) and sales taxes is also associated with faster growth.

But VAT has its costs Barbone et al. (2012) presents a review on literature on the costs of VAT and they identified the following drivers in compliance costs:

- The complexity of legislation, like the number of 'lines' to be drawn exclusions, exemptions, deductions, rate differences, goods/services distinctions, costs involved in explaining legislation, making rulings and determinations
- Procedural requirements, the number of returns, requirements for supplementary documentation; treatment of cross-border transactions; and, of course, registration. The latter is an especially key factor in VAT because possession of a VAT number carries with it the potential to, in effect, write a payment order on the Treasury without the Treasury approving it or even being aware of it.

- The size and nature of clientele (number of taxpayers; structure of economy and of business sector), the importance of B2B (transactions between VAT registrants) relative to B2C.
- The difficulty of verifying 'self-assessed' information, which varies with such factors as the size of the informal sector; the extent and nature of links between formal and informal sectors; 'border effects' on information flows; the extent to which efforts are made with respect to verification and chasing down suspect cases; extent of e-invoicing; and the role played by tax professionals (accountants in particular).

Correia (2010) shows that tax on consumption allows for redistributive policies with no costs in terms of efficiency, its main conclusion is that the tax burden is more evenly distributed under the simplest and most efficient tax code, the flat tax rate on consumption, the other conclusion, is there exists a mix between income and consumption taxes that can redistribute without imposing efficiency losses[9]. Atkinson and Stiglitz (1976) (AS) extend by Mirrlees (1971) pioneering study on optimal income taxation by allowing for several consumption goods. AS demonstrate that, with certain restrictions on the underlying preferences, taxing consumption becomes redundant and the social optimum is attainable by levying a labor tax only.

Using a real-effort experiment Blumkin et al. (2012) with university students as subjects, they found, that a tax on labor subjects, reduce their labor supply by 33% on average compared to the no-tax treatment, significantly more than the 15% decrease in labor supply when is introduced an equivalent consumption tax. Also Riedl and Van Winden (2012) compare experimentally the economic performance of a small open economy subject to a wage tax (WT) with one subject to a sales-tax-cum-labor-subsidy (STLS). In the WT treatment, producers pay a wage tax on each unit of labor hired. In the STLS treatment, producers incur a sales tax on products sold, but also receive a subsidy for each unit of labor hired. According to most economic indicators, the STLS outperforms the WT. To explain their results, the authors propose that the upfront burden of a WT and uncertainty about product prices render producers reluctant to hire labor. McCaffery (2008) says that consumption taxes has in its favor its administrative advantages compared to an income tax (i.e., simplicity of measuring consumption versus labor income and ease

[9] For a more complete view of the theoretical contributions on the direct–indirect tax mix, see Atkinson and Stiglitz (1980), also Ahmad and Stern (1984), Boadway and Pestieau (2003), and Auerbach (2006).

of collection and enforcement) and the elimination of the inter-temporal distortion of consumption allocation caused by the taxation of capital income. Toder and Rosenberg (2010) through econometric simulations for the USA case, found evidence that the distributional burden of a VAT is roughly proportional at the bottom but regressive at the top, substituting a VAT for a proportion of payroll taxes would make the US fiscal system slightly more progressive and the VAT is much less progressive than a corporate income tax and is also mentions that using different taxes could raise the administrative marginal costs in such way that it could not be a good option to adopt VAT in US case.

OECD and KIPF (2014) found using OECD data that VAT, when measured against income is regressive, but slightly progressive when measured against expenditure, they state that reduced VAT rates could have beneficiated more the rich than the poor. Decoster et al. (2010), using EUROMOD and data from 6 countries[10], also concluded that indirect taxes are regressive with respect to disposable income but proportional or progressive with respect to total expenditures, but indirect taxes are in any case less progressive than other components of the tax system and they are less progressive than the systems of social insurance contributions of employees.

Krusell et al. (1996) using a political-equilibrium theory and the neoclassical growth model to compare consumption and income tax systems, state income taxes are not necessarily worse in welfare terms, and may even be better, consumption taxes induce lower output than income taxes as agents internalize the higher distortionary cost induced by income taxes.

In terms of financing social expenses through indirect taxes Bird and Smart (2012) analyzed the substitution of payroll taxes for VAT to finance social expenditures in South America where he suggests in countries with large informal sectors it is probably best to finance incremental expansions of social programs from broad-based taxes like VAT instead of payroll taxes. Levy (2010) like Bird and Smart (2012) analyzed the interaction between the formal and informal sector, and they found that usually small firms stay out of the formal sector and these are the least efficient firms on the economy, which increases the need for social programs for the informal workers and so subsidies to this sector paid by the formal sector, hurting the global economy by reducing the global welfare. Evaluating the Levy (2010) proposal for Mexico where he has proposed financing Social Insurance from the VAT instead of

[10] Belgium, Hungary, Ireland, United Kingdom and Greece

through contributory payroll taxes, Antón-Sarabia and Hernández-Trillo (2010) found that the VAT revenue/GDP ratio would increase from 3.8% to 6.8%, real wages would increase 21% due to the elimination of social contributions, if taking into account the tax evasion from firms the revenue/GDP ratio would be nearly unchanged.

For the EU, Ainsworth (2011) comments the experiment in EU to implement in some countries a reduced VAT rate in labor intensive sectors in order to increase jobs on those sectors, it was found that didn´t happen and a reduction on payroll direct costs would have a 52% higher impact on employment than what would occur under a general tax cut.

Thomas and Picos-Sánchez (2012) tested two reforms a reduction in all SSC rates by five percent fully funded by an increase in the standard VAT rate; and the same five percent reduction in all SSC rates fully funded by increasing reduced VAT rates using data from 13 OECD countries[11], they concluded that those actions would increase work incentives for low-income workers at both participation and hours-worked margins. However these increases will generally be small as part of the VAT increase will still be borne by low-income workers. Gadenne (Unpublished Work) analyzed for the French case, a decrease in payroll taxes financed by an increase in the VAT and she found workers always gain, and capital owners always loose, the increase in labor income relative to capital income would be 7.1%. In an opposite conclusion, Rebiere (2013) analyzing the French proposal to introduce a social VAT, found that in an open economy when the international capital mobility is sufficiently high, workers are more inclined to suffer from the reform but in close economy the opposite occurs.

[11] Finland, France, Hungary, Luxembourg, Poland, Slovak Republic, Spain, UK, Austria, Greece, Ireland, Netherlands and Germany.

2.1 Summary of relevant literature

Table 5: Summary of relevant literature

Goal	Approach	Results	Author
Construct a formal model of the effects of labour and VAT contrasting in particular their incidence on wages, their implications for government revenue and for equity, and their effects on the informal economy.	The author used a formal model	The analysis highlights a number of key factors that favor incremental financing of social insurance through a broad-based tax like VAT in Latin America in place of expansion of the payroll tax.	Bird and Smart (2012)
Effects of imposing a new value added tax (VAT) in the United States and using the revenue raised to lower payroll tax and corporate income tax rates	Microsimulation model disaggregates consumption into twenty-two different categories, derived from the Bureau of Labor Statistics' Consumer Expenditure Survey (CEX) and calibrated to NIPA aggregates.	Both a VAT and a payroll tax are neutral between current and future consumption and do not discourage saving and investment. The distributional burden of a VAT is roughly proportional at the bottom of the income distribution but regressive at the top.	Toder and Rosenberg (2010)
A Reduced Rate of VAT for Labor Intensive Services in UE and its effects with the purpose of stimulating Employment	In 1999 the EU began experimenting in nine Member States	EU macro-economic simulations based on these findings also suggest that the best way to use payroll tax incentives to increase employment is to use them to directly reduce the cost of labor. Frequently, the VAT reduction did not pass-through to consumers as a price reduction	Ainsworth (2011)
Study of the fiscal incidence of a fiscal reform consisting of a reduction in employers' social insurance contributions financed by a tax based on the value added in France	The author used a formal model	In an open economy when the international capital mobility is sufficiently high, workers are more inclined to suffer from the reform but in close economy the opposite occurs	Rebiere (2013)
Test the effects of the effects of reducing social contributions while compensating with the increase of VAT	Using a Microsimulation program- EUROMOD, for 5 EU countries	Indirect taxes are regressive with respect to disposable income but proportional or progressive with respect to total expenditures, and indirect taxes are in any case less progressive than other components of the tax system	Decoster, Loughrey et al. (2010)
		Countries with the least	

Verify the welfare effects of income and consumption taxes	Use a political-equilibrium theory and the neoclassical growth model to compare consumption and income tax systems.	reliance on consumption taxes (CT) are all associated with relatively small transfer systems and high output levels; CT induce lower output than income taxes	Krusell et al. (1996)
Check if income and consumption taxes ever are really in terms of labour supply	Using economic students tested the effects of a 50% flat wage tax imposed on earned income and the equivalent consumption tax treatment, a 100% ad-valorem tax is levied on both consumption goods	Subjects reduce their labor supply by1/3 in income tax compared to the no-tax treatment, while in consumption tax the decreases only about 15% of the no-tax	Blumkin et al. (2012)
Verify the effects of the increase of VAT in five percent while reducing SC contributions in five percent	Uses data from 12 EU countries from 2003 to 2006	They increase work incentives for low-income workers However, these increases will generally be small as part of the VAT increase will still be borne by low-income workers	Thomas and Picos-Sánchez (2012)

2.2 Critical analysis of the literature reviewed

All the previous studies except Blumkin et al. (2012) and Riedl and Van Winden (2012)[12], assume no behavioral response to changes in tax, the emergence of behavioral finance has already shown us the different bias from humans[13] and if we don´t take them into account we can end with wrong conclusions, but is hard to insert a behavior response in an model[14], even though we should try to include those bias in order to reach to better assessments and so better answers. We also have different conclusions for the same subject (e.g. Ufier (2014) and Krusell et al. (1996)), usually this is due to different methodological approaches or samples which don´t allow us to compare the results from different author´s, being this one of the major difficulties when addressing literature.

[12] To check the an overview of modern field experiments and their usage in economics see Levitt and List (2007, 2009)

[13] Here is a list from some of our emotional and cognitive bias from behavioral finance literature:

- Availability-Kahneman (2003)
- People are highly suggestible-Johnson and Goldstein (2003)
- Overconfidence-Svenson (1981)
- Representativeness-Kahneman and Tversky, (1973)
- Anchoring-Kahneman and Tversky (1974)
- Self-attribution bias-Hastorf, Schneider and Polefka (1970)
- Hindsight bias- Fischoff, (1975)
- Mental accounting bias-Thaler (1985)

[14] To check the major critics to Behavioral Finance, see Fama (1998)

Recently studies from EU[15] and OECD[16] state that personal income taxes and social security contributions paid by employees affect the decisions of individuals about taking paid work and the number of hours they work, hence impacting labor supply and corporate taxes are found to be most harmful for growth, followed by personal income taxes, and then consumption taxes. But Rebiere (2013) for the French case reached a different conclusion, confirming Johansson et al. (2008) assessment: "*As institutional settings vary significantly across OECD countries, the effect of taxation on long-run unemployment is likely to be highly country specific"*, which don´t allow an extension to more developed countries from the results of Antón-Sarabia and Hernández-Trillo (2010), Levy (2010) and Bird and Smart (2012).

In short the studies, in general, lack behavioral responses and they are from different periods, countries or use different methodologies which prevent us to extend the analysis, but they leave clues which can allow us to reach better solutions.

[15] Check http://ec.europa.eu/europe2020/pdf/themes/02_taxation.pdf
[16] See Johansson and et al. (2008)

3 Taxation an overview

In this chapter we analyze the historical evolution of taxation ratios, how usually is the tax structure in OECD countries and weights of each tax and finally an analysis of direct vs indirect taxation in terms of its weights and effects on macro-economic variables, with special emphasis in employment.

3.1 Historical evolution of tax ratios

The level and structures of taxation differ widely across OECD members. The total share of taxes on GDP (including social security contributions) varies widely, between a minimum below 20% of GDP in Mexico (19.7%) in 2013 and a maximum close to 50% in Denmark (48.6%). The historical evolution of tax ratios can be divided in 4 periods:

1. From 1965 to 1975 the tax burden increased 3.8 p.p. (percentage points), until the first oil shock (between 1973 and 1974) the strong and almost interrupted income growth enabled tax rises in all OECD countries.
2. From 1975 and 1985 the tax burden increased 3.1 p.p., in middle of the 70´s due to slower growth in income levels and higher unemployment levels limited the government's capacity to raise revenue from tax rates rises. But after the second oil shock in 1979 in order to finance higher spending in social security and to balance budget deficits, countries especially in Europe saw their tax ratios rise again.
3. From 1985 to 1995, the tax burden increased 1.9 p.p., because most countries reduced their statutory rates, where the negative impact from tax rates reduction was often offset by the elimination of tax reliefs.
4. From 1995 onward, the tax burden increased 0.1 p.p. so the lowest increase of all 4 periods, in fact the growth rate of tax burden as we saw decreased through time. In this period we need to look until 2000, where the tax burden reached a record of 34.3% then fell slightly until 2004, rising between 2005 until 2007, before fell again after the crisis in 2007 to the previous levels.

3.2 Tax structure

- *Taxes on income and profits*

On average OECD countries collected 34% of their tax revenues through taxes on income and profits. The variation in the share of personal income tax between countries is considerable, it ranged from 9% in Slovak Republic to 51% in Denmark.

In terms of corporate income tax the ratio was on average from 1965 until 2012 of 9%, but within the OECD countries the share in total taxes show a considerable spread from 3% in Greece, Slovenia and Hungary to 25% in Norway. These differences are partly explained by instructional factors and the importance of mineral resources in the local economy (e.g. oil in Norway).

- *Social security contributions*

Again, OECD countries show a wide variety in the share of social security contributions in total tax, from Australia and New Zealand, where there aren't social security contributions to Slovak Republic where this value reaches 44%. Where employers pay on average 55% of the total amount while the employee pays the remaining. Since 1965 the employee share increased from 6 p.p. to 10 p.p. in the share of the total tax while for the employers this share increased from 10 p.p. to 15 p.p..

- *Property taxes*

The share of property taxes fell from 8% to 5% and in relative terms in four countries the property taxes exceed 10% of the total tax revenue, respectively Canada, South Korea, UK and USA.

- *Consumption taxes*

The total share from these taxes fell from 36% to 31% of the total tax revenue from 1965 to 2012. But their composition changed a lot since 1965. General consumption taxes represent now 20% of the total, while in 1965 was approximately 12%, this change shows the growing importance of VAT. This increase served to compensate the diminishing share of specific consumption taxes (e.g. taxes on Tabaco), they more than halved there total weight from 1965, passing from a weigh of 24% in 1965 to 11% in 2012. Nevertheless new specific consumption taxes have been created, namely environmental related taxes.

3.3 Direct and indirect taxation

In 1965 the share of direct taxes was around 61% while in 2012 represented 66%, the indirect taxation represented 39% in 1965 while in 2012 reached a level of 34%, but if we divide the direct taxation in personal income taxes and social security contributions, we see a decrease from 44% in 1965 to 40% in 2012 while social security contributions increased from 18% to 26%.The most recent proposals from institutions like IMF and OECD tend to suggest a shift from direct to indirect taxation, the reasoning of these

proposals are mainly connected to find a way to maintain the actual levels of taxation while increasing employment. Their motivation is that by reducing taxation of labor, returns to labor income would become more attractive and hence encourage the take-up of jobs, particularly at the lower end of the wage distribution (and depending on labour supply elasticities). Currently, labor market participation is low in several EU countries compared to the US or in Japan. Mobilizing the "missing" labor resources would undoubtedly boost GDP significantly. Also VAT seems to have space for improve its efficiency, using VAT Revenue Ratio (VRR)[17] that is the measure which is commonly used for assessing VAT performance, and basically is defined as the ratio of actual VAT revenue to the revenue that would be raised if VAT were levied at the standard rate on all consumption with perfect enforcement[18]. Barbone et al. (2013) estimated an average VRR Gap for the EU-27 (from 2000 until 2011) of 47%.

In 2014 the tax wedge was on average 36%, with Belgium with a value of 55.6% and Chile with 7%, where the Social Security contributions represent the main share of this value, ranging from 83% in Poland and 0 in New Zealand. The negative impact on employment of employees' social contributions can be less than that of taxes, if the rate of return of pension's contributions is not too far from the rate of return on individual savings.

Cutting personal income taxes would *not* directly reduce enterprises' production costs, unless enterprises were able to cut salaries by the same amount. If there is an offsetting increase of taxation of goods, this however seems unlikely, owing to the long run

[17] VAT revenue ratio (VRR), which represents the "ideal" revenue that could be generated by a VAT system applied to consumption as measured in National Accounts, without exemptions or reduced/zero rates and with perfect enforcement (or zero VAT Gap). The VRR gap is a summary measure of the shortfall in VAT revenue collections, compared to a benchmark of uniform taxation of all consumption, and full compliance by taxpayers. More specifically, the definition of the VAT Revenue Ratio gap: *VRR Gap* = 1 – *(Actual Revenue) / (Notional Ideal Revenue)*, where the Notional Ideal Revenue is defined as the standard rate of VAT times the aggregate consumption of the household, non-profit, and government sectors, as recorded in the national accounts.

[18] The VRR measure is not without some problems. For example, it assumes that moving to the benchmark tax would not affect either the level or composition of consumption, which is unlikely (Alm and El-Ganainy 2013). In addition, it assumes that "consumption" as defined in the national accounts is the same as the aggregate tax base that would be subject to such an ideal uniform comprehensive VAT. As OECD (2014b) shows, however, in principle a number of adjustments to national accounts data are needed to estimate something closer to the real base of the VAT because final consumption as reported in the accounts includes some items that are not subject to VAT and excludes some items that are subject to VAT. Finally, even if the national accounts base is simply accepted, several different versions of the c-efficiency ratio may be calculated depending on the precise nature of the consumption base chosen: for example, Alm and El Ganainy (2013) use final household consumption expenditure (as do Borselli et al. (2012)), while the present report, like Keen (2013), uses a broader conception of final consumption that also includes such consumption not only by households but also by the government and non-profit sectors. In practice, final consumption is measured in expenditure terms and includes not only private final consumption expenditures by households but also final consumption expenditures by non-profit organizations serving households as well as by general government. All are at the end of the supply chain and in principle should therefore pay VAT on their inputs. However, because the output of government and non-profit sectors is usually not subject to output VAT, they cannot deduct such input VAT which thus becomes part of their costs as well as part of potential VAT revenues. For a complete discussion about VRR see Barbone et al. (2013).

behavior of labor supply. Specifically, if VAT is increased by the same amount as personal income taxes are cut, the price of goods would increase so that for many salaried workers the *real,* as opposed to the *nominal,* wage rate might not increase. The supply of labour is usually thought to depend on the real wage rate; if the latter does not increase, the former should not increase either. In other words, if my take-home pay increases by 20%, but the price of all goods goes up by the same percentage, there is no compelling reason why I should modify my behavior and work longer hours, as we are going to see more ahead other author´s show different results.

Two often-raised arguments in favor of a shift to a consumption tax are its administrative advantages compared to an income tax (i.e., simplicity of measuring consumption versus labor income and ease of collection and enforcement) and the elimination of the inter-temporal distortion of consumption allocation caused by the taxation of capital income (see McCaffery (2002)).

Jackman et al. (1996) argue labour supply (and therefore wages) depends on the total tax burden of a worker household, if VAT is de facto largely paid by workers there is little scope for a positive labor market reaction from the shift. Hence the issue is not straightforward; it is necessary to evaluate carefully, in a general equilibrium model, how the rebalancing in taxation would affect labor supply, before we can judge the effects on output. Supply (and therefore wages) depends on the total tax burden of a worker household, if VAT is de facto largely paid by workers there is little scope for a positive labor market reaction from the shift. Hence the issue is not straightforward; it is necessary to evaluate carefully, in a general equilibrium model, how the rebalancing in taxation would affect labor supply, before we can judge the effects on output.

The specific features of the labour market institutions also play an important role in determining the effectiveness of the envisaged shift. Factors such as the centralized vis-à-vis decentralized nature of wage bargaining, union power, the precise characteristics of the unemployment benefits (e.g., even the question whether benefits are taxed or untaxed) and the existence, level and coverage of minimum wages are likely to exert an important influence on the existence of real wage resistance and hence the outcome, particularly in the short-term. This implies that any shift would be likely to have different effects across countries.

But in a real experiment Blumkin et al. (2012) tested the effect from direct and indirect taxation in labour supply and they found evidence that post-paid consumption taxes encourage higher labor supply than equivalent pre-paid wage taxes. Their hypothesis is based on money illusion, that is, individuals' observed tendency to think in nominal rather than real terms. An individual suffering from money illusion will typically display

a reluctance to accept a nominal wage cut or to sell a house at a nominal loss. Likewise, is anticipated that individuals to respond more adversely to a nominal wage cut (due to a wage tax) than to a reduction in the real wage rate (due to a consumption tax). And their results corroborate the money illusion explanation, because individuals affected by direct taxation reduced their labour supply by 1/3 on average compared to the no-tax treatment, significantly more than the 15% decrease in labor supply in individuals affected by indirect taxation.

So it's not consensual the opinion of several authors regarding the effects from the change from direct taxation to indirect taxation, in a study from OECD (OECD (2006)), they show results from growth regressions cautiously supporting the hypothesis that countries with a higher share of indirect taxation have tended to grow faster in the last decades, but for example Poterba (1996), where is studied the effect from the changes in the mix of direct and indirect taxation, conclude that in the majority of the countries from their sample a revenue-neutral switch from direct to indirect taxes has no impact on the level of long term economic activity. Another important argument against the change from direct to indirect taxation is the impact on income distribution, Duncan and Peter (2008) found that progressivity reduces inequality in reported gross and net income, but as a much smaller impact on inequality when is approximated by consumption-based measures of Gini.

In terms of long term effects, literature is also inconclusive, Piketty et al. (2011) look at evidence from 18 OECD countries on tax rates and economic growth for the 1960-2010 time period. The authors find no evidence of a correlation between growth in real GDP per capita and the drop in the top marginal rate for the 1960-2010. Mendoza et al. (1997) and Garrison and Lee (1992) find no tax effects on growth in developed countries. Padovano and Galli (2001) find that a 10 percentage point reduction in marginal tax rates raises the growth rate by 0.11 percentage points in OECD countries. Engen and Skinner (1992) find significant effects of taxes on growth in a sample of 107 countries, but the tax effects are small and insignificant when estimated only on developed countries.

From literature we can't say what is the best system or what is the correct mix from direct and indirect taxation, because the results are so diverse, but in order to increase the number of opinions, in this paper we will propose a new form of taxation that in our opinion will affect the level of savings for retirement and also the total amount collected by governments.

4 Social security systems around the world

In this chapter we analyze the design of current pension systems, the current situation, the recent developments in OECD countries and finally the contingent liabilities due to reliance of most countries in unfunded pension systems, which is important in this study because we recommend a transfer to funded system.

4.1 Design of Pension Systems

According to Turner (1998) the structure of retirement income systems can be characterized as a four tier system.

1. The first tier is a government-provided anti-poverty benefit. It provides a social safety net. It includes means tested and income tested benefits for low income elderly and flat benefits that are received based on years of residence. This tier is usually financed out of general government revenue.
2. The second tier is a mandatory unfunded defined benefit scheme or notional defined contribution scheme provided through the government social security system. This tier is the traditional pay-as-you-go (PAYG) social security system found in most countries. It provides social insurance for workers against some economic risks by spreading the effects of risks across the population.
3. The third tier is funded benefits. These could be provided by the government or by private sector entities. This tier could be combined with the second tier as a single partially funded plan. This tier could be mandatory or voluntary. When it is voluntary, the fourth tier can be distinguished from it as being composed of non-pension arrangements. While generally it is important have a funded source of retirement income, it is not essential in all countries that the source be mandatory.
4. The fourth tier is voluntary and supplementary. It includes private savings, voluntary occupational pension schemes, voluntary individual pension accounts, labour earnings, support from family members, and charity. In some countries, savings in the form of housing is an important aspect of retirement savings in the fourth tier. Housing can be used both as an investment that is liquidated in retirement and as a source of services that are paid for before retirement.

4.2 Current situation of Social Security Systems

Population ageing and reduction of fertility rate had increase the dependency ratio, there is no consensus among demographers on trends over the very long term, e.g. whether there is a natural biological limit to longevity, the impact of future medical breakthroughs, long-term impact of public health programmers and societal behavior such as reduction of smoking rates or increased prevalence of obesity. Past population projections from official sources have, however, generally underestimated the gains in life expectancy at birth as it was difficult to imagine that the reduction of mortality would continue at the same pace in the long run. Some commentators have argued that as a consequence, governments may have underestimated the potential budgetary impact of ageing populations (Commission and Committee (2014)), this risk is known as longevity risk (unexpected increases in life spans) (United Nations (2013)). Also total fertility rates in OECD countries have declined dramatically over the past few decades, falling on average from 2.7 in 1970 to 1.7 children per woman of childbearing age in the 2000s. In all OECD countries, fertility rates declined for young women and increased at older ages[19].

Most of the social security systems have a pay-as-go system (PAYG) (OECD (2013a)),where benefits paid to retirees are contributed by workers paying into the system currently. This means that in many countries, pension expenses will tend to rise.

Recent reforms have aimed at maintaining or restoring financial sustainability of pension systems by reducing future pension spending (OECD (2013a)). In order to improve the sustainability of pension systems, governments typically use the following three measures i) increases in the statutory retirement age; ii) improved provision of financial incentives to work beyond retirement age, e.g. through work bonuses and increases in pension benefit at retirement; and iii) less or no early retirement schemes. Retirement ages will be at least 67 years by around 2050 in most OECD countries (OECD (2013a)), despite some author´s argue against it (e.g. Fanti (2014)).

The tax wedge on labor[20] in 2013 was on average 35.9% (Belgium with 55.8% and Chile with 7% are the extremes) in OECD countries, where 13.1% refers to income tax, 8.26% to the social security contributions from the employee and 14.29% to employer social security contributions (OECD (2014d)).

Between 1990 and 2009 the public expenditure on cash benefits for old-age and a survivor increased 27%, reaching on average 7.8% of the GDP and 16.6% of the

[19] In order to see some possible causes see Mace, R. (2014), Buhr and Huinink (2014), Berrington and Pattaro (2014) and D'Addio and d'Ercole (2005)

[20] Picos-Sánchez (2011) analyzed the effect of indirect taxes on tax wedge of households compared with OECD (2014b)

government spending in OECD countries and is expected to reach 11.7% of GDP in 2050 (OECD (2014c)), where the main driver of this increase is the dependency ratio.

In terms of future responsibilities, according to Mink (2008) the estimated implicit pension obligation, using a discount rate of 5%, yields a burden for the euro area of 174% of GDP in 2005. A lower discount rate of 3% increases this figure even further, to 217% of GDP, in 2050 it expected to reach 193% and 243% of the GDP for a discount rate of 5% and 3% respectively, despite the difficulties to calculate the above values[21].

Pension reforms made during the past decades reduced the promise for workers who enter in labour market, working longer could atone these reductions, but the future don't for future retirees don't seem bright.

4.3 Recent developments on Social Security Systems

Below we try to sum up by the conclusions and recent developments according to the OECD publication *Pensions at a Glance* (OECD (2013a)).

We need to save more and work longer, increasing the normal pension age has been the most common reform during the past five years. As a consequence, the majority of OECD countries will have a retirement age of at least 67 years by the middle of this century. A few countries are going beyond this age by linking increases of the pension age directly to the evolution of life expectancy. Large structural reforms leading to a complete overhaul of the pension system have been rare in recent years. But several countries introduced or have decided on the future introduction of a defined-contribution pension scheme, for example the Czech Republic, Israel and the United Kingdom. At the same time, two countries (Poland and Hungary) reduced or closed their privately-managed funded defined-contribution schemes.

Poor currently protected but everyone will get less in future, while pensioners were largely protected in the initial phases of the financial and economic crisis and sometimes even benefited from discretionary increases in pensions as part of economic stimulus programmes, retirees are now also being affected by expenditure cuts in the context of fiscal consolidation. For example pension benefits have not been increased since 2009 in Ireland, but retirees were still relatively less affected by declines in income than the working-age population. In Portugal, pension benefit levels were frozen in 2011, and the 13th and 14th monthly payments were abolished for higher-paid pensioners[22]. Workers

[21] For more information about the difficulties to calculate the estimated implicit pension obligation see Holzmann et al. (2004) and Yermo (2007).

[22] In 2014 this measure was reversed due to a decision from the Portuguese Constitutional Court, being partially compensated by recalibrating the exceptional contribution already in place for pensions above 1350 € (CES-Contribuição Extraordinária de Solidariedade), for more check

who enter the labour market today will be promised lower pension benefits than previous generations due to the series of reforms OECD countries implemented over the last 20 years. Working longer may compensate for some of these reductions but in general every year that workers contribute toward their future pension is credited with lower benefits in defined-benefit schemes than before the reforms. In Korea, for example, the target replacement rate for pensions is falling from 50% to 40% for workers who have contributed during 40 years. In Austria, the pension entitlement accrual rate is being reduced from 2% per year of contributions to 1.78% over time. Accruals at various earnings thresholds have also been reduced in the Czech Republic and the United Kingdom.

More workers need to be covered in emerging economies, for the non-OECD countries recent reforms have concentrated primarily on increasing the level of coverage, which is currently much lower than that of OECD countries. For example, China introduced a new rural pension in 2009 to provide social assistance to rural residents as they are not covered by the urban pension. This was extended nationally to include non-salaried urban residents from 2012, after regional trials in 2011. In May 2009 the Indian government permitted voluntary participation for all private-sector workers in the New Pension System as previously only state employees was covered. This scheme is currently being expanded to include the 300 million workers in the unorganized sector by partially matching contributions and investing heavily in public awareness campaigns.

Pension promise will decrease, future benefits are set to decline across all of the earnings distribution, but the patterns differ markedly between countries. In most cases, countries did aim to protect the lowest earners from benefit cuts. In Mexico, full protection was given to the poorest 30% of all workers who will be eligible for the minimum pension, provided that they have made the necessary contributions during their working lives. In Greece and Portugal, the reduction of pension benefits is considerably lower for those in the bottom quarter of the earnings distribution. Sweden is a particular case in this respect: lower earners were protected compared to average earners, but the reforms actually benefit the richest 20% of workers most while the largest reductions are borne by those between the 40th and 70th percentiles. In all other countries apart from Sweden the highest earners will be most affected by the reforms. In Greece, for example, future pensions for the richest 10% of workers will be only half of what they would have been if no reforms had taken place.

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http://www.portugal.gov.pt/en/the-ministries/minister-of-the-presidency-and-of-parliamentary-affairs/keep-updated/20140102-cm-paef.aspx

Early retirement access is being tightened, this means that the issue of early retirement has not been covered. But it should be noted that many countries have also tightened or discouraged access to early retirement schemes. For example in Greece the early retirement age has gone from 53 to 60 years, while in Portugal access to early retirement was suspended until at least 2014. But it is unlikely that all workers will be in a position, for health or other reasons, to actually work fully up until the sometimes substantially higher retirement ages; countries will need to monitor this situation, ensure that working conditions are such that working longer is a possibility and provide targeted support both to keep workers with health problems or physically demanding occupations in the labour force and to provide benefits to those who cannot work. In some countries there is also a policy debate around the career length needed to reach full, unreduced benefits and whether it is fair to expect people who started to work at young ages in work until 67 or beyond.

Pension adequacy issues remain, as population ageing progresses expenditures will rise but the recent reforms will likely at least stabilize, if not reduce, future pension spending. At the same time, policy concerns around adequacy are likely to increase in some countries. Countries with traditionally limited public pension systems, such as New Zealand and the United Kingdom, are addressing adequacy concerns by promoting individual pension provision through auto-enrolment schemes. In Australia, contributions to mandatory funded pensions have been increased for the same reason while Germany has chosen to offer tax credits to people taking up voluntary private pensions. The distributional implications of a stronger reliance on private defined-contribution pension schemes will need to be monitored carefully as lower-income workers will find it harder to contribute sufficient amount over long periods to such schemes.

Public services are retirement income enhancers. This is especially true of healthcare and long term care services. Services benefit the poorest retirees much more than they do richer elderly households. Public support is set to play an increasingly important role in preventing old age poverty among people requiring health and long term care service.

Regulations that allow individuals greater choice over the way their retirement savings are invested in private plans. Canada, Estonia, Hungary, Israel, Mexico and Poland, for example, have adopted this policy, supported by measures to move people automatically into less risky investments as they get closer to retirement.

Several countries are trying to increase their administrative efficiency, for example Australia introduced a simple, low-cost new scheme – My Super – in July 2013 with the aim of providing a default superannuation product with a standard set of features for

comparability. Similarly, the Chilean government has been fostering competition among plan managers to courage the emergence of affordable, cost-efficient schemes. In Sweden a new low-cost fund, AP7, has been competing with expensive investment options since 2010. In the same vein, Japan setup a new authority in 2010 to run public schemes at a lower cost, while centralized private pension management is a policy objective in Mexico and the United Kingdom. Denmark, Greece, Italy and Sweden have merged the different authorities in charge of managing and paying social security benefits. In Greece, for example, the number of plans had dropped from 133 to just three by the end of 2010.

4.4 Contingent liabilities in pension systems, unfunded vs funded liabilities.

The reform of public pension systems has become a key policy issue in many countries. Because conventional approaches to reform largely unfunded retirement income schemes prove politically and economically difficult, attention has focused on the option of a partial shift towards funded provisions. Yet this too presents problems. The liabilities to the current generation of retirees and workers under an unfunded pension scheme constitute a huge, hidden public debt. Most countries find that making this implicit debt fully explicit, repaying it and thus reversing the initial redistribution towards the start-up generation, lie beyond their political, economic and fiscal capacities. As we saw earlier the population ageing due to low fertility rates and rising life expectancy, further system maturation in many countries, the result of past policy decisions on coverage and benefit levels, the likely adverse labour market implications of high contribution rates and insufficient links between contributions and benefits, and the negative effects on private and national saving, arising possibly from the unfunded character of the schemes and certainly from the impact on public saving of the fiscal imbalances that they generate.

Pension liabilities are the present value of the difference between projected contributions and expenditures of the social security pension system. Eichhorst (2010) present some values of the implicit pension debt and also shows that the methodology used in order to calculate it is an important aspect to take into account, because using one method we can achieve 357% of the GDP for Italy, while in other method we can see ´only` 157% for the same country. Even though this paper shows that the implicit debt can go from 68% for the UK to 185% for Greece of their GDP, this taking into account the methodology with the lowest values. In a very recent study for Portugal the GEP/MSESS (2015) evaluated also the implicit pension liability, assuming a 5% discount rate we see a the implicit debt reaches 84%, while using a 3% discount rate the value reaches 180% of

2013 GDP what adding to the present explicit 138,1%[23] we can reach 318%.This public debt is not included in the official numbers, what in our opinion can mislead the general public, but it seems that is not ignored by financial markets, using the premium for sovereign risk derived from derived from the credit default swap (CDS) market, the explicit government debt position (explicit and implicit debt positions) according to Ponds et al. (2011), is highly correlated reaching values from 0.58 to 0.78.

The previous numbers represent a very high bill to future generations to pay, Holzmann (1997) taking this into account presents the potential benefits from moving from unfunded to funded systems, below a brief list of those benefits:

- The approach can break deadlock in traditional reform attempts because it implies a time consistent and hence credible reform (Holzmann (1994)), by stressing the economic advantages and the positive impact on economic growth, it opens arguments that all can win, thus abandoning intractable zero-sum games and shifting the discussion from distributional concerns to efficiency and growth issues. It provides transparency by explicitly distinguishing between the saving-insurance functions of a pension system (individual accounts and individual equity) from those of redistribution and social protection, and reduces the scope for future opportunistic behavior by politicians.
- It isolates retirement provisions from political interference and risk (Godoy and Valdes-Prieto (1997)).
- It heightens workers' concern for financial issues and enterprise performance, reducing the dichotomy of interests between capital and labour (Piñera (1991)).
- This reform establishes a close link between contributions and benefits, thus reducing the labour market distortions of traditional, unfunded programs (Pordes (1994)).
- The reform furthers and accelerates financial market development and thus efficiency of resource allocation (Davis (1998), Holzmann (1996)).
- The reform positively affects national saving and capital accumulation (IMF (1995)).

The main problems of this transition are the promised benefits to the actual and future pensioners, as we saw previously for Portugal for example they could represent 180% of 2013 GDP. Holzmann (1997) proposes some strategies for this transition, some were and are being implemented by some countries as we saw earlier, regardless of that we are going to expose them because in overall they are pertinent and relevant or our study.

[23] Data obtained from OECD, for more see https://stats.oecd.org/Index.aspx?DataSetCode=QASA_TABLE7PSD

- Strategy 1: would reduce the Social Security Debt (SSD) by curtailing future commitments, through an increase in the retirement age, a decrease in the annual accrual factor or a change in the indexation procedure (say, from wage to price indexation).
- Strategy 2: involves a partial shift towards a funded system, thus making only part of the SSD explicit.
- Strategy 3: applies an expenditure-minimizing procedure to determine the compensation to individuals willing to switch to the funded scheme and forego the benefits of the unfunded on. Setting the switching age exogenously (say, all below age 40) either does not conform with individual preferences and thus undermines support for the reform or does conform but is at least as expensive as the individual voluntary decision. There are two extreme options: under the radical option, all commitments — to the entire labour force (including recent entrants) and to those already retired — are compensated. The faster the envisaged transition, the more the cash flow requirement is frontloaded. Under the minimal option, only new entrants to the labour market participate in the funded scheme. This reduces the cash flow requirements to the level of the operational deficit, which rises as expenditures remain for many years while contributions decrease continuously. The transition ends only when the last eligible person dies (after some 80 years).

As we saw there aren't easy solutions to reduce the burden on future generations of pension expenditures and basically all solutions are valid, but each country needs to agree, discuss and understand which path they want follow, without that any reform is condemn to failure.

5 Our proposal

Johansson et al. (2008) highlighted the potential growth benefits of shifting the tax mix away from taxes on labor towards consumption taxes, Blumkin et al. (2012) also present evidence from a real-effort experiment with real goods, where consistent with money illusion and tax misperception, when is introduced a tax on labor subjects reduce their labor supply by 33% on average compared to the no-tax treatment, significantly more than the 15% decrease in labor supply when is introduced an equivalent consumption tax. In particular there is a strong case to broaden VAT bases and reduce or eliminate products and services that beneficiate from reduce rates, due to revenue lost through the usage of reduced rates, In most countries the marginal source of general revenue is usually the VAT[24], which is often both the largest and one of the most elastic revenue sources available (Bird and Smart (2012)). Barbone et al. (2013) estimated an average VRR Gap for the EU-27 (from 2000 until 2011) of 47% and a median of 49%, they also estimated the policy gap (is defined as the ratio between the VAT Total Tax Liability, total amount of estimated VAT payments on the basis of national accounts aggregates and the existing structure of rates and exemption)[25] for the same countries and period with an average of 36% and a median of 29%, the interpretation of these results is that an important amount of revenue loss during the period 2000-2011 stemmed (in most countries) from choices made over time that have introduced and sometimes extended multiple rates and exemptions.

OECD and KIPF (2014) argue that reduced rates could have benefit more the rich than the poor (e.g., reduced rates on hotel accommodation and restaurants) and Barbone et al. (2012) point out that VAT fraud is influenced by the choices of base.

According to OECD (2014d), almost in every country from OECD the employer contributes to social security (exceptions are Chile, Denmark and New Zealand) and all (except Chile), have personal income taxes (PIT), our proposal aims to the elimination of booth due to the increase of the incentives to work (Blumkin et al. (2012) and Thomas and Picos-Sánchez (2012)), a reduction in income taxes while increasing value added

[24] The VAT in 1965 represented on average 2% of total tax revenue in OECD countries, but in 2012, constitutes 19% of total revenue (OECD and KIPF (2014)).

[25]Policy Gap is defined as the ratio between the VTTL(VAT Total Tax Liability, total amount of estimated VAT payments on the basis of national accounts aggregates and the existing structure of rates and exemptions) and the "ideal" VAT As Keen (2013) notes, the policy gap may be thought of as zero if a single VAT rate is applied perfectly, with no compliance gap, to all final consumption (and only to such consumption) – subject, of course to the caveats noted elsewhere about exactly how consumption is actually measured. In effect, this is equivalent to a measure of the extent to which the legal structure of the actual VAT embodies 'tax expenditures' as compared to the assumed normative standard of a uniform tax on all final consumption. This concept provides a useful summary measure of the extent to which the c-inefficiency (VRR) ratio is attributable to political decisions embodied in tax law rather than to how well that law is enforced.

(VAT) and sales taxes is also associated with faster growth (Ormaechea and Yoo (2012) and Ufier (2014)), a shift to a consumption tax could reduce administrative costs compared to an income tax (McCaffery (2008)), there is a lot of space to increase the tax revenue through VAT as we can see o the estimated average VRR Gap for the EU-27 (from 2000 until 2011) of 47% and a median of 49% ((Barbone et al. (2013)) and Correia (2010) shows that tax on consumption allows for redistributive policies with no costs in terms of efficiency.

We propose the elimination of the PIT and its replacement for a unique VAT rate and elimination of extended multiple rates and exemptions, aiming for a 0% VRR. The total costs for employers will continue the same, (so the total nominal costs are the same for employers) which allows that future salary increases have reduced costs for employers and the creation of an individual social account, which is financed through:

- Direct contributions, an amount is discounted directly in the employee salary
- Indirect contributions, an amount of the VAT paid is returned to the consumer through a credit in his social account.

The purpose of this individual social account should be a long term one, whose goal is to finance pensions for employees when they reach the end of their working years. The contributor should have the possibility to choose the profile of its investment and who is going to manage his money. In order to simplify the process there could be a default option, because as Benartzi and Thaler (2007) and Choi et al. (2004) showed people usually stick with this option. In order to avoid complications the default option could be a fund with 50% stocks, 50% bonds and managed privately to avoid political interference, but the participants could have the choice to choose any fund with any style as it happens in the Kiwi Saver in New Zealand[26]. Governments should only create a market where funds compete for the money of the contributors in order to reduce management costs as the Chilean experience shows (Holzmann (1997)), should also oblige funds to report their performances, commissions, incentivize international investment in order to reduce risk through diversification (Markowitz (1968)) and control and avoid collusion. There are several articles (e.g. Poterba et al. (2006) and Shiller (2005)) studying the performance of pension funds, but the best option usually depends on the risk profile of the investor.

When the retirement age is reached, it should be mandatory the purchase of an annuity with the accumulated amount in order to finance the retiree old age expenses, the retiree could have the possibility to use a part of that value immediately, but it should be mandatory a guaranteed a minimum monthly income amount in old age in order to avoid

[26] For more see http://www.kiwisaver.govt.nz/.

misuse of their lifetime savings. We recommend this, because Agarwal et. al (2009) found that after age 60, the prevalence of dementia roughly doubles every five years. By the time people reach their 80s, more than half will suffer from either dementia or other significant cognitive deficits. They also had great difficulty understanding simple measures of risk. When asked which numbers represented the biggest risk of getting a disease, 1 in 10, 1 in 100 or 1 in 1000, an astounding 29% of older adults (ages 65-94) could not answer the question correctly! (Peters (2008a), (2008b)).

The pensioners will continue to contribute to their pensions through the indirect contributions, these will finance part of the actual pension and also create a buffer to cover the longevity risk (unexpected increases in life spans which can increase pension fund liabilities by as much as 10 percent (Antolin (2007)), direct SSC cease to exist when the retiree reaches retirement, so when retirement is reached the pensioner only makes indirect contributions. These indirect contributions post retirement could continue to have the same default profile of investment as the fund to where the retiree contributed previously, continuing to give the option to choose to him.

The retirement age should be accordingly to the total accumulated capital, his life expectancy and the 70% net replacement rate target of the last salary (we suggest this value due to Antolin (2007) suggestion), despite being hard to define what level of replacement the pension replacement rate should target. A simple starting point is to say that standards of living in retirement should be the same as those enjoyed during working life. But working-age people may have to meet a number of needs which retirees no longer have, such as transport costs or work-related expenses. And people who were low earners during their working lives may need pension replacement rates of 100%, or even higher. Those who enjoyed higher earnings may still have a very comfortable retirement with replacement rates substantially below 100%. After this amount being reached the pensioner could have the freedom to choose if he wants to continue to work, to retire or booth. So the option to for example work part-time receiving a salary and the pension should be available, in this case the rules continue to apply, the retiree pays direct and indirect contributions, from his salary and expenses.

Before we develop our proposal, we are going to specify why we suggest an acquisition of an annuity. Annuities have the potential to solve some complex problems individuals struggle with, like when to retire and how much they can spend each year in retirement, and thus might be expected to be attractive for that reason (Benartzi et al. (2011)). Yaari (1965) wrote a seminal paper demonstrating that under some specific assumptions rational individuals with no bequest motive should convert all of their retirement wealth to an annuity at retirement. The argument is subtle yet compelling. Suppose you only

care about your own utility, and you do not know how long you are going to live. You can either invest your money in a bond or buy an annuity. Yaari shows that by buying an annuity you assure yourself a higher level of consumption in every year that you live, compared to holding the bond. The reason is that those who die early subsidize those who live a long time. In the literature, this is called the "mortality premium." Since by assumption those who die early no longer care about consumption, they do not mind sharing their wealth with those lucky enough to still be around. In effect, an annuity is an insurance policy with a negative price. You increase your consumption and eliminate risk at the same time, so an annuity strictly dominates the investment alternative. In order to make the annuity products safer a government guarantee could be provided, along the lines of the Federal Deposit Insurance Corporation for banks and the Pension Benefit Guaranty Corporation for pension plans in USA or Deposit Guarantee Schemes in EU. A case can be made that the government should address this problem, perhaps by selling *longevity bonds* (Thomsen and Andersen (2007)) in which the yield adjusts to changes in life expectancy[27].

Now we will see how the payment of taxes and contributions to the social account will be made. Taxes will be paid through VAT and we will only have one rate and tax all consumption[28] (this rate should be the same as the corporate and saving options in general to simplify the system), for now let´s assume a 25 % tax rate, where 10% goes to the individual social account and 15% for paying taxes (so 60% of 25% goes to taxes and 40% of the 25% goes to the social account).

The transactions should tend to be exclusively be made by electronic means, in order to simplify the system, to reduce evasion (Schneider (2013) says*:" Electronic payments can help countries increase revenues and reduce cash, the shadow economy's key enabler*"), increasing by 10 % automatic payments annually for at least four consecutive years could shrink the shadow economy by 5% (Schneider (2013))[29], the shadow economy comprises legal business activities that are performed outside the reach of government authorities. These activities typically fall into two categories that remain common across Europe. The first is undeclared work, which accounts for roughly two-thirds of the shadow economy. It includes wages that workers and businesses do not declare to the government to avoid taxes or documentation. Undeclared work is widespread in construction, agriculture and household services (such as cleaning,

[27] For more in longevity bonds, see e.g Blake et al. (2006a), Blake et al. (2006b) and Bauer and Ruß (2006).

[28] We are not including for now tobacco and mineral oils due to its specific regulation, see http://ec.europa.eu/taxation_customs/taxation/excise_duties/index_en.htm.

[29] Schneider (2013) is a work sponsored by Visa, so it could have some conflict of interest, but he mentions that Romania, which has established a national system for POS and online tax payment via bank card and managed to raise tax payments by card by 34 per cent year-on-year.

babysitting, elderly care, and tutoring). The other one-third comes from underreporting, which is when businesses (primarily those that deal heavily in cash, such as small shops, bars, and taxis) report only part of their income to avoid some of the tax burden (Schneider (2013)). Automatization of payments could also minimize compliance costs (like time, labour cost and expert advice) and administrative costs (those that are borne directly by the public sector, and indirectly by all taxpayers, like budgetary costs of revenue department and judiciary and other costs related to dispute resolution) of VAT, but also other costs like psychological (Evans (2008), Lopes (2008) and James and Edwards (2010) have noted to the psychological costs induced by tax compliance[30]). We propose an automatic system, but it could also be available to cash payments. So how payment system would work?

We assume that every citizen has a bank account and a debit, credit card or any other form (like the mobile phone or any the possibility to use a biometric form of payment, see e.g. Jain (2007)), the maintenance of the bank account and the possession of the form of payment should be free in order to incentive this form of payment. Central authorities should use the actual system or incentivize market players to create new forms of payment in order to simplify the payment system and to reduce administrative and psychological costs.

The default option of the payment (to check the power of default options see Johnson and Goldstein (2003) and Choi et al.(2004)) is associated to the citizen fiscal number (ideally should only be necessary one number to identify the citizen, with no need for a ID, Social Security, Fiscal, etc. card) and automatically the tax amount is transferred to a state account and the rest for the seller, in our best knowledge the only proposal similar to this automatic procedure is Hombek (2009), but he proposes the creation of a bank account, to where the payment is transferred after the sale and only after the tax is transferred to the fiscal authority the seller as the possibility to access the net amount. Anyone should have at least 30 days to cancel the operation, and the fiscal authority would keep all the tax paid for 30 days ((Barbone et al. (2012) states that the average

[30] Evans (2008) goes on to note that "in addition to this generally accepted hard core of compliance costs, there are a number of other costs that need to be considered. For example, there is little doubt that there will always be a measure of psychological cost that is induced by the operation of the tax system. Taxpayers suffer stress, anxiety and frustration as a result of attempting to comply with their tax obligations. Lopes (2008) estimated the costs for a small sample of Portuguese taxpayers, she reached to the conclusion that those costs are higher for people older than 65 years, with lower levels of education and women, but she also highlights the difficult to calculate these costs, in terms of total costs including psychological ones she reached to an average cost of 63.8€ for those with punctual professional help and 640.61€ for with professional help. James and Edwards (2010) list several interesting examples of behavioral and experimental research which appear to offer some promise of future practical relevance (e.g. Coleman and Freedman (2002)). In particular, it is perhaps worth noting that at least one such study (Hasseldine and Hansford, 2002) suggests that psychic costs are positively associated with financial costs of compliance.

refund period for EU countries is 30 days, so we use this number), when this deadline is over the fiscal authority should transfer the social security individual contribution to individual social account and make the calculations of the relation with seller, because the seller could have the right to be reimbursed[31](for a description of how the VAT works see OECD and KIPF (2014)). The 30 days could be more, because it should be a fix date every month where the tax authority and the taxpayer settle their accounts.

In this system the tax authority and social security managing entity should be the same in order to facilitate the relation with citizens, creating a more simple way to comply and to receive the reward (the social security contribution), and as Naritomi (2013) demonstrates for the Brazil case, taxpayers like to receive a reward for tax compliance, Commission (2013) also recommends a tax prize (deduction or reimbursement) in order to combat fraud. Because VAT has the advantage of refund if booth tax payers report the transaction this could create a chain effect that could eliminate or reduce evasion (as De Paula and Scheinkman (2010) observed), besides of returning a part of the tax to the tax payer in order to reinforce the incentive, it should be mandatory in every receipt or invoice to have the fiscal number if that is not the case, the one that paid the service or product if wants to prove that transaction, for some reason (refund, warranty, etc.), could only do it if the invoice or receipt mentions his fiscal number, that would happen in automatic way if the consumer used an electronic pay system, because the bank or any other entity that possesses the money from the consumer would provide the fiscal number automatically in the transaction and this must be the default option in order to simplify the payment process. The consumer must have the option to refuse to give is fiscal number, so the electronic payment system must provide this option.

To stimulate the declaration of the amount to the labor force, labour costs could have a weight of 105% (for example the company pays 1000€ to the worker, in fiscal terms it would value 1050€), increasing with age, in order to stimulate companies to hire older workers (for example 105% for those until 30 years old, 107.5% for those between 30 and 40 years old, and so on), because the world population is ageing (United Nations, (2013)), we need to stimulate more working years in order to prevent a slower GDP growth (Martins et al. (2005)).

[31] Under the invoice credit method (which is a "transaction based method"), each trader charges VAT at the rate specified for each supply and passes to the purchaser an invoice showing the amount of tax charged. The purchaser is in turn able to credit that input tax against the output tax it charges on its sales, remitting the balance to the tax authorities and receiving refunds when there are excess credits. This method is based on invoices that could, in principle, be cross-checked to pick up any overstatement of credit entitlement. By linking the tax credit on the purchaser's inputs to the tax paid by the purchaser, the invoice credit method is designed to discourage fraud. 32 of the 33 OECD countries employing a VAT use the invoice credit method (OECD and KIPF (2014)).

In order to prevent local residents to make all their consumption outside the country where they receive their income, it should be mandatory that at least 50% of the total income be as consumed and declared in the local country, if that is not the case the direct social contributions of all the year are apprehended in their full amount as fine. Also if system was global, that is if system would be adopted by all countries, part of the VAT paid outside the residence country could be transferred to the Individual social security account.

Some remarks not included on the previous development of the idea:

1. In e-commerce transactions, it should be possible to automatically have the same method, so when the taxpayer is paying the product or service, automatically the seller with the data from the buyer should charge the VAT rate applied in country of the buyer and the same would happen, the tax is transferred automatically to local fiscal authority, this would imply a world connected system supervised by a world entity like for example the World Trade Organization, where all of those who want to have the possibility to use e-commerce, should be connected to the various fiscal entities and , according to the data from the seller, charge the VAT in order to don´t give them advantages in relation with local entities.
2. In world without money paper, we could have the risk of the confiscation of financial assets, in this case, laws should be created to prevent this.
3. In a world free of money paper, all our activities would have a digital registration, laws to prevent misuse of this data should be created.
4. We mentioned before the 4 tiers of the present social security system, the first tier is a government-provided anti-poverty benefit, in our opinion this tier should continue to exist, because there could be people not able to save enough during their working years for some reason (long term unemployment, sickness, etc.) and in order to guarantee some harmony in society, governments should provide an anti-poverty benefit. This tier should be provided some cash pension but also should include free and easy access to long term care services, free or reduced prices for public transportation in order to facilitate the usage of healthcare services, so basically it should include free public services in order to guarantee a minimum quality of life for those benefiting from this tier. Of course the access to this tier should be highly controlled in order to avoid free riders.
5. Our proposal intends to create a three tier social security system, so as we mentioned in the previous point, we think the first tier should be maintained and the same should happen to the present fourth tier. The fourth tier is voluntary and

supplementary. It includes private savings, voluntary occupational pension schemes, voluntary individual pension accounts, labour earnings, support from family members, and charity. So anyone that wants to save more than what is defined in our system should be allowed to do it. So the first tier is a government-provided anti-poverty benefit, the second tier is funded benefits and third tier is voluntary and supplementary.

6. As Blumkin et al. (2012) showed, the incentive to work be higher due to a bigger nominal salary, indirect tax have an anesthetic effect (Pinto (2011)) easing the psychological costs of paying taxes and in the case of the VAT could have an a chain effect of the declaration of transactions, but we could continue to have direct taxes and apply only our proposal to the functioning of the VAT.
7. We mentioned that we also would tax savings, the system would function in the same way, capital gains and other forms of saving would be taxed with the same rate as the defined VAT and part of that tax would be transferred to the individual social account, because as Gordon et al. (2004) not taxing capital gains and extensive free saving accounts were introduced, it verifies that the total revenue decreases and it even could subsidize capital gains and Dynan et al. (2004) demonstrated the rich save more, so exempting savings could have a regressive impact and be a subsidy to those with higher income.
8. In order to stimulate the ones with lower resources to declare that consumption and also to have an equity fiscal system, until a pre-determined amount of income a percentage of the tax paid is returned to the consumer, for example the consumer have an income of 6000 euro per year, and assuming a tax rate of 25%, where 60% goes to tax and the rest for the social security account, so from those 60% let's say half is returned to consumer, these reimbursements should be the most rapid possible in order to give the consumer the feeling that compensates to declare his consumption and also to maintain a reasonable level of income for those with less resources.
9. We didn't addressed other taxes like tobacco or property taxes, in our opinion those taxes could continue with the same rates and rules. In the case of tobacco for example we think also that a part of the tax should be transferred to the individual social account in order to encourage declaration of the consumption. One could argument that in that case a system with one rate would not apply, we disagree because the basic level of taxation could be the same with only a monetary addition in order to reach the actual levels of taxation for these products.

5.1 The transition between systems

In our opinion the transition between the actual system, where we have a mix of direct and indirect tax system and in the majority of countries a 4 tier social security system should be done as quick as possible, but we should take some aspects in consideration:

1. It would be necessary a large campaign to inform all citizens how the system works.
2. Those who are not comfortable with digital payments should receive extra support.
3. Businesses should receive some support in order to implement a digital payment only system.
4. The new system should have at least one experimental year in order to check how it works and how society adapts to him. Also this would allow to understand its problems and to create solutions to resolve them.
5. One of the hardest parts of this transition would be for sure the treatment of social security implicit debt. As Holzmann (1997) mentioned there are several strategies to go from an unfunded to funded pension system, in our opinion the something similar to the third strategy is the most adequate one, where all that discounted to the old system, so the entire labour force (including recent entrants) and to those already retired are compensated. Governments could try to discuss a reduction of this burden by proposing to the actual members some discount on their benefits. This would provoke a big jump in the levels of the explicit public debt, but as we saw the explicit government debt position (explicit and implicit debt positions) according to Ponds et al. (2011), is already highly correlated with the cost of financing debt, so probably there would not be a panic in financial markets due to this move. But to make sure that don't happen, we think this new explicit debt should be treated differently, central banks could loan with 0% interest rate all the amount of this new explicit debt and allow only a % usage per year only to pay pensions of the all amount in order to avoid inflation escalations. The duration of this loan should be around 80 years, because the transition ends only when the last eligible person dies (after some 80 years).

Other author´s like Kaldor (1955), Hall et al. (1995) and McCaffery (2008) proposed new fiscal systems without much success, we hope that our proposal could find a different result.

5.2 Our theory put to test

In this section we will use data from Portugal, first we are going to use a collective example and then an individual one and we also will check the differences between the revenue from the actual and the new system. For simplification we use data only for on country, but this model can be applied in any country with the specific adaptions.

5.2.1 Aggregate example

For this example we are going to use Portugal GDP data from INE (Instituto Nacional de Estatistica) for 2013 in order to compare the level of tax revenue and social security contributions that Portugal have in the actual system with our proposal. We are going to include different scenarios for shadow economy, because as Schneider (2013) mentions automatic payments could reduce shadow economy. So we are going to include a 0% level shadow economy, the same level of shadow economy as estimated by (Afonso (2014)) for Portugal in 2013 (the value estimated was 26,81%) and a reduction of that value of 10% and 5%. Below our assumptions:

- For the Domestic demand we used data from INE for 2013 and we added the weight of PIT in Domestic Demand, so for 2013 the total domestic demand was 167.894,5 M€ and Total PIT was 19684.2 M€, so 11.7% of total domestic demand, so for the base scenario 187.578,7 M€ (167.894.5*(1+11.7%))
- For each scenario we reduce the level of shadow economy in 5%
- For each scenario we estimated the level of VAT tax rate and VAT SSC rate needed in the new system to have the same level of revenue as the actual system, so column 6 and 7 represent the 2013 revenue for direct and indirect tax and SSC, respectively in the actual system. Columns 8 represent the VAT rate in new system needed to get the same level of revenue as the actual one. Column 9 represent the rate needed in the new system to have the same SSC revenue, here we are ignoring the direct contributions already made by individuals.

Table 6: Comparison between the actual system (AC) and our proposed system (NS) for Portugal.

Domestic Demand (in M€) (1)	187.578,7	196.957,7	206.336,6	215.715,5	225.094,5	237.868,6
Level of Shadow economy (2)	**26,81%**	**21,81%**	**16,81%**	**11,81%**	**6,81%**	**0,00%**
Total Tax colected NS (15%) (3)	**28136,80**	**29543,648**	**30950,48**	**32357,32**	**33764,16**	**35680,28**
SSC NS (10%) (4)	**18757,87**	**19695,77**	**20633,66**	**21571,55**	**22509,45**	**23786,86**
Proposed VAT Rate (5)	**25%**	**25%**	**25%**	**25%**	**25%**	**25%**
Total Tax colected AC (6)	43335,3	43335,3	43335,3	43335,3	43335,3	43335,3
Social contribuitons AC (7)	15115,5	15115,5	15115,5	15115,5	15115,5	15115,5
VAT Tax rate (8)	23,1%	22,0%	21,0%	20,1%	19,3%	18,2%
VAT SSC Rate (9)	8,1%	7,7%	7,3%	7,0%	6,7%	6,4%
Total VAT Rate (10)	31,2%	29,7%	28,3%	27,1%	26,0%	24,6%

Source : INE

In the above table we see that only with 0% of shadow economy we reach a global of 25% of the VAT rate, despite with a different mix. In all other cases the rate is above 25% and our proposed mix is never reached. Even with a 0% level of shadow economy we don't reach the level of revenue in actual scenario, we get behind 18%, while in the base scenario the difference reaches 35%. So it seems that our proposed rates are insufficient, despite we are ignoring external effects (like reduction of unemployment expenses, increase of administrative efficiency, etc.), they don't present a similar level of revenue as the actual ones. We need also to remember that we are not including the VAT Gap, that according to Barbone et al. (2013) represented in 2011 for Portugal 0.8% of the GDP.

For the base scenario we observe a 31.2% global VAT rate to reach the same level of revenue for tax and SSC. This level seems too high and could incentivize people to find new forms to escape taxation, increasing the level of shadow economy. On the other hand we need to consider that net salaries will increase (in the following section for someone with 1000€ gross salary, the increase is around 25%, but someone with the minimum salary is of 6.3%), despite less than the increase of 36% from 23% (actual top VAT rate in Portugal) to 31.2%.

5.2.2 Individual example for the actual system

- Annual gross Salary:14000 € (in Portugal the salary is paid 14 times, so 1000€ per month)
- Meal subsidy: 1210 € (assuming 22 working days in 11 months and 5 € per day, we assume 1 month for vacations and holydays)
- Social security contribution rate from the employee: 11%
- Social security contribution rate from the employer: 23.75%

- Personal income tax :13.15%[32] (using data from Personal income tax code from Portugal and ignoring any added deduction)
- VAT rate: 20% (Portugal have 3 rates for the VAT 23%, 13% and 6%, but the large majority of products and services are subject to the 23% so we use a 20% rate), and we assume that the citizen consumes all is available income in taxable goods in Portugal at the average rate of 20%.

For the new system:

- Annual gross Salary: 18535 € (in Portugal the salary is paid 14 times, so 1000€ per month plus the meal subsidy of 1210 plus the employer SSC of 3325€ (23.75%*14000€) that now is paid directly to the individual, and as we said the nominal labor costs are maintained).
- Meal subsidy: 0€, all retributions from the employer to the employee are included on his salary without any deduction in order to simplify the tax system.
- Social security contribution rate from the employee: 20%.
- Social security contribution rate from the employer: 0%, in the new system the employer no longer pays SSC.
- Personal income tax: 0%, in the new system PIT disappears.
- VAT rate: 25% for all products and services, special or reduced taxes disappear and all services and products are taxed in order to keep the system simple and to eliminate the VRR Gap for the Eu-27 of 49%, where 15 p.p. refers to tax and 10 p.p. to social personal security account, the highest rate in EU is 25%, so we selected this value. And again we assume 0% of saving.

[32] Using the 2015 PIT from Portugal (check http://info.portaldasfinancas.gov.pt/pt/docs/Conteudos_1pagina/NEWS_Portuguese_Tax_System.htm), the PIT is calculated in the following way, Gross salary (14000€)-Specific deductions (according to the Portuguese tax code its 4104€)=9896€* tax rate (this value is splinted by two levels, the first 7000 € is subject to a rate of 14,5% the next level 2896€ (9896-7000) is subject to a tax rate of 28,5%, what gives a final value of 1840,36€ (1840,36/14000=13,15%).

Table 7: Comparison between the actual system and our proposed system for Portugal

	Actual system		New system		Adapted new system	
Data	Values	Rate	Values	Rate	Values	Rate
Anual gross salary	14.000,00 €		18.535,00 €		18.535,00 €	
Employee SSC	1.540,00 €	11,00%	3.707,00 €	20,00%	3.707,00 €	20,00%
Meal	1.210,00 €		0,00 €		0,00 €	
PIT	1.840,36 €	13,15%	0,00 €	0,00%	0,00 €	0,00%
Net Salary	**11.829,64 €**		**14.828,00 €**		**14.828,00 €**	
Employeer SSC	3.325,00 €	23,75%	0,00 €	0,00%	0,00 €	0,00%
Total Employer Costs	**18.535,00 €**		**18.535,00 €**		**18.535,00 €**	
Employee salary SSC	1.540,00 €		3.707,00 €		3.707,00 €	
Employee VAT SSC	0,00 €	0,00%	1.482,80 €	10,00%	1.201,07 €	8,10%
VAT	2.365,93 €	20,00%	2.224,20 €	15,00%	3.425,27 €	23,10%
Total tax	4.206,29 €	30,04%	2.224,20 €	12,00%	3.425,27 €	18,48%
Total SSC	4.865,00 €	26,25%	5.189,80 €	28,00%	4.908,07 €	26,48%

Source: INE

The net salary increases by 25.35%, the total tax is reduced by 47.12% and the SSC increase by 6.7%. The saving rate would be automatically of 28% above the 15% mentioned by Antolin (2009) necessary to reach 70% replacement of the last salary (remember that he assumes a constant return rate of 6%, what could be optimistic) and above the actual 26.25% if we consider all the amount paid by the employer. If we simulate the same case but for someone with the minimum salary in Portugal in 2013 of 485€ per month and without PIT, we get a reduction of 20% of the total tax collected and an increase of 14% in total SSC, but if we admit a devolution of half of VAT paid and so an effective 7.5% charge the reduction of the total tax collect rises to 60%.

We also include an adapted version to include the scenario where the rates are the ones we get in collective example for the base scenario where the VAT tax rate needs to be 23.1% and the SSC needs to be 8.1% in order to get the same revenue as the actual system. In this case the reduction on tax revenue is of 18.57% and the SSC raises only 0.89%.

5.2.3 Individual example of a future pensioner

Regarding the individual future pension we also estimated how much a pensioner could earn during his pension. Here are the assumptions:

- A monthly salary of 1235.67€ (so the 14828€ annual salary estimated in table 3 divided by 12 months).
- An increase of the salary of 1% per year in order to give a more conservative view.
- We simulate 5 cases of working careers, 25, 30, 35, 40 and 45 years.

- A contribution rate of 28% (as shown in table 3) and the amount is only used for pension payment.
- The amount is invested in a portfolio with 50% stocks and 50% bonds, where the return for bonds are of 0,16% per month (1,1% per year) and for stocks of 0,42% per month (5,2% per year), we use data from *Credit Suisse Global Investment Returns Yearbook 2015* (Dimson (2015)).
- A retirement period of 20 years.

Table 8: Simulation of retiree pension in 45 years using our proposal

Period	Initial Salary	Initial Contribuiton	Monthly Return	Total Capital	Final Pension	Last Salary
45 years	1.235,67 €	345,99 €	0,29%	522.144,20 €	3.001,61 €	1.858,14 €
40 years	1.235,67 €	345,99 €	0,29%	411.802,63 €	2.367,30 €	1.767,95 €
35 years	1.235,67 €	345,99 €	0,29%	320.115,56 €	1.840,22 €	1.698,97 €
30 years	1.235,67 €	345,99 €	0,29%	244.066,00 €	1.403,04 €	1.616,51 €
25 years	1.235,67 €	345,99 €	0,29%	181.145,22 €	1.041,33 €	1.616,51 €

Source: (Dimson (2015) and author´s calculations.[33]

In the above table we can verify that the final pension exceeds the last salary in 62% in a 45 year scenario and until 35 years of contributions the pension exceeds the last salary, for the 30 year scenario we reach 86% and in the 25 year scenario the pension represents 64% of the last salary, what means that only in this scenario the suggested replacement rate of 70 % by Antolin (2007) isn't reached. We don't include on this simulation the contributions post retireme, which in our proposal could represent a more sustainable pension system. But we also need to remember that we didn't include unemployment and situations of very short careers due to some misfortune. We can't affirm that our system is more sustainable than the actual one. Even tough according to OECD (2013a) for Portugal the net replacement rate for a median earner is 65,6% in line with our scenario of 25 years of contributions.

[33] See appendix 1 for more detail on calculations

6 Conclusions and suggestions

6.1 Answer to our questions

It is possible to eliminate income taxes and maintain the same level of tax revenue?

The answer is no if we consider a 25% global VAT rate, in our simulations we can't reach the same tax revenue booth in an aggregate and individual level. In aggregate level in a state where the level of shadow economy is as Afonso (2014) estimated we only can reach that level with 31.2% VAT rate, where 23.1% refers to tax, only with a 0% level of shadow economy we reach a VAT rate of 25%.

It is possible to eliminate or reduce the "underground" economy?

The answer is inconclusive, because we can't test the above question, but according to Schneider (2013) states that increasing by 10 % automatic payments annually for at least four consecutive years could shrink the shadow economy by 5%, so we believe that our suggestion of a passage to a no money paper world could reduce shadow economy improving public finances, as show in the example from Afonso (2014), where if this value was 0% for Portugal and using a 20% overall tax burden the fiscal deficit would be for 2012 of 0.85% instead of 6.43%.

It possible to have an individual social security account that provides an adequate income when necessary?

Our findings are inconclusive, because we simulate a very simple case without taking into account unemployment and other misfortunes, but in our simulation with 35 years or more of social security contributions we have a final pension with a value superior to the last salary and even with 25 years we reach a replacement level of 64% without taking into account the post retirement contributions.

6.2 Main Contributions

The main contributions of this study to the world of academic knowledge lay on these aspects:

a) In our best knowledge, our proposal can't be found in current literature, but we can say that is a collection of ideas from several authors and goes on line with the recent recommendations from institutions like IMF and OECD tend to suggest a shift from direct to indirect taxation. In fact there are studies that empirically show that this shift can increase labour supply (Blumkin et al. (2012)), that VAT

adoption is associated with an increase in growth and investment as well as lower inflation and government spending as a share of GDP (Ufier (2014)) and a reduction in income taxes while increasing VAT and sales taxes is also associated with faster growth (Ormaechea and Yoo (2012)). Regarding the financing of SS other authors also proposed something similar (e.g. Bird and Smart (2012) and Levy (2010)), despite in a different way, the change or a least a the increase on weight of VAT in financing SSC, but our proposal goes farther including a passage to a funded pension system, the inclusion of a totally automatized payment system in order to reduce the weight of shadow economy and the elimination of any exemptions in VAT. But the devolution of tax paid as a contribution to an individual social security account is our opinion the most innovative aspect of this study, that we hope can help future authors and policy makers to increase the sustainability of social security systems and the saving rates.

b) We also analyzed how the transition between systems could be made we hope that some of our remarks could be useful for policy makers.
c) Finally we made an approach to booth the tax and social security systems, the most important systems in public finances, when usually booth are treated separately, but in our opinion there are interconnected and if we want to counter the problems that both face, futures studies should take that into account.

6.3 Limitations and suggestions for further research

We need to work and save more that is the message from the latest *Pensions at a Glance* (OECD (2013a)), due to the reduction of the fertility rate, an ageing population and the past promises made to current and future retirees. Public expenses with pensions will grow (OECD (2014c)), and people don't seem to save enough to face their retirement years according to OECD.

The financing of future pensions come essentially from taxes (OECD (2013a)) and at moment we have already a tax wedge on labor of 35.9% in 2013 in OECD countries (OECD (2014d)).

The most recent proposals from institutions like IMF and OECD tend to suggest a shift from direct to indirect taxation, the reasoning of these proposals are mainly connected to find a way to maintain the actual levels of taxation while increasing employment.

Taking this into consideration we look propose a new form to finance public expenses and for a more sustainable pension system, while incentivizing labor supply, firms to hire and the reduction of the shadow economy. We proposed basically a system where

all taxation is made indirectly with only one rate and the elimination of any exemption. We propose a system where all taxes are financed by consumption and saving and part of tax paid is transferred to individual social security account.

We tested our proposal for the case of Portugal in a simplified way, and we found that the tax needed to reach the current levels of tax revenue would be approximately of 31.2%, in our opinion probably too high, what could increase and not reduce the actuals levels of shadow economy. We also tested the income provided to pensioners, where we found that for contribuitons of 35 years or more the pensioner could reveive a pension higher than his last salary and even with 25 years the replacement rate is similar to the actual one.

Our proposal has the benefits of providing a very simple system with only one tax, one rate, without exemptions, the reward of declaring all consumption and a money paper free world. In theory these benefits seem to be in right direction but our study present several limitations, first we don't test it in all countries, second we don't take into account the full the effects on GDP of the change of the tax system, like employment, inflation and changes in consumer behavior, third, we also don't present a quantification of how much public systems and firms could save with a system with only a indirect system, fourth we don't quantify the psychological costs from this change to policy makers, consumers and firms, fifth we don't test our system with high levels or prolonged situations of unemployment to verify if our system is able to face this situation, sixth we don't quantify the costs to firms of having an electronic payment system, seventh we were not able to verify the effects of our proposal in shadow economy, eight our simulations are based in very simple assumptions what could misrepresent our findings.

Our suggestions would be for future studies, that all the previous limitations were taken into account and quantified in order to give a more robustness to future works.

References

Books

Hall, R. E., et al. (1995). The flat tax, Wiley Online Library.

Hobbes, T. (1651). Leviathan, Penguin Classics Edition 1982.

McCaffery, E. J. (2002). Fair Not Flat, Chicago, IL: University of Chicago Press.

McCaffery, E. J. (2008). Fair not flat: How to make the tax system better and simpler, University of Chicago Press.

Mill, J. S. (1871). Principles of political economy, Prometheus Books Edition 2004.

Lopes, C. M. M. (2008). "Quanto custa pagar impostos em Portugal?–Os custos de cumprimento da tributação do rendimento." Almedina, Coimbra.

Piñera, J. (1991). "El cascabel al gato." Santiago: Editorial Zig Zag.

Pinto, J. A. P. (2011). Fiscalidade, Areal Editores,

Papers

Afonso, Ó. (2014). A Economia Não-Registada em Portugal.

Agarwal, S., et al. (2009). "The age of reason: Financial decisions over the life-cycle with implications for regulation." Available at SSRN 973790.

Ainsworth, R. T. (2011). "Will cutting the payroll tax increase jobs in the U.S.? Empirical evidence from the EU VAT." Tax Notes International: pp. 581-590.

Antolin, P. (2007). Longevity risk and private pensions, OECD Publishing Paris.

Antolin, P. (2009). "Private pensions and the financial crisis: How to ensure adequate retirement income from DC pension plans." OECD Journal: Financial Market Trends **2**: 153-179.

Antón-Sarabia, A. and F. Hernández-Trillo (2010). VAT Collection and Social Security Contributions under Tax Evasion: Is There a Link?

Atkinson, A. B. and J. E. Stiglitz (1976). "The design of tax structure: direct versus indirect taxation." Journal of Public Economics **6**(1): 55-75.

Barbone, L., et al. (2013). "Study to quantify and analyse the VAT Gap in the EU-27 Member States." Case Network Reports(116).

Barbone, L., et al. (2012). "The costs of VAT: A review of the literature." Case Network Reports(106).

Bauer, D. and J. Ruß (2006). Pricing longevity bonds using implied survival probabilities.

Benartzi, S., et al. (2011). "Annuitization puzzles." The Journal of Economic Perspectives: 143-164.

Benartzi, S. and R. H. Thaler (2007). "Heuristics and biases in retirement savings behavior." The Journal of Economic Perspectives: 81-104.

Bird, R. M. and M. Smart (2012). "Financing Social Expenditures in Developing Countries: Payroll or Value Added Taxes?" International Center for Public Policy, Andrew Young School of Policy Studies, Georgia State University(1206).

Blumkin, T., et al. (2012). "Are income and consumption taxes ever really equivalent? Evidence from a real-effort experiment with real goods." European Economic Review **56**(6): 1200-1219.

Borselli, F., et al. (2012). "Patterns of Reduced VAT Rates in the European Union." International VAT Monitor, January-February: 13-21.

Buhr, P. and J. Huinink (2014). "Fertility analysis from a life course perspective." Advances in Life Course Research **21**(0): 1-9.

Choi, J. J., et al. (2004). For better or for worse: Default effects and 401 (k) savings behavior. Perspectives on the Economics of Aging, University of Chicago Press**:** 81-126.

Commission, E., Ed. (2013). Combating tax fraud and evasion.

Commission, E. and E. P. Committee (2014). "The 2015 Ageing Report: Underlying Assumptions and Projection Methodologies."

Correia, I. (2010). "Consumption taxes and redistribution." The American Economic Review **100**(4): 1673-1694.

Davis, E. P. (1998). "Pension funds: retirement-income security and capital markets: an international perspective." OUP Catalogue.

De Paula, A. and J. A. Scheinkman (2010). "Value-added taxes, chain effects, and informalit." American Economic Journal: Macroeconomics **2**(4): 195-221.

Decoster, A., et al. (2010). "How regressive are indirect taxes? A microsimulation analysis for five European countries." Journal of Policy Analysis and Management **29**(2): 326-350.

Dimson, E., Marsh, P., and Staunton, M. (2015). "Credit Suisse Global Investment Returns Yearbook 2015." Credit Suisse.

Duncan, D. and K. Sabirianova Peter (2008). "Tax progressivity and income inequality." Andrew Young School of Policy Studies Research Paper Series(08-26).

Dynan, K. E., et al. (2004). "Do the rich save more?" Journal of political Economy **112**(2): 397-444.

Eichhorst, W. (2010). "Pension systems in the EU–contingent liabilities and assets in the public and private sector."

Engen, E. M. and J. Skinner (1992). Fiscal policy and economic growth, National Bureau of Economic Research.

Evans, C. (2008). "Taxation compliance and administrative costs: an overview." Tax Compliance Costs for Companies in an Enlarged European Community.

Fanti, L. (2014). "Raising the Mandatory Retirement Age and its Effect on Long-run Income and Pay-as-you-go (PAYG) Pensions." Metroeconomica **65**(4): 619-645.

Gadenne, L. (Unpublished Work). Financing Welfare Expenditure in France: the Incidence of Different Reform Scenarios

Garrison, C. B. and F.-Y. Lee (1992). "Taxation, aggregate activity and economic growth: further cross-country evidence on some supply-side hypotheses." Economic Inquiry **30**(1): 172.

GEP/MSESS (2015). " Avaliação Actuarial do Sistema Previdencial da Segurança Social."

Godoy, O. and S. Valdes-Prieto (1997). "Democracy and pensions in Chile: Experience with two systems." The economics of pensions: principles, policies and international experience. Cambridge: 58-91.

Gordon, R., et al. (2004). "Toward a consumption tax, and beyond." American Economic Review: 161-165.

Hall, R. E., et al. (1995). The flat tax, Wiley Online Library.

Hasseldine, J. and A. Hansford (2002). "Compliance Burden of VAT: Further Evidence from the UK, The." Austl. Tax F. **17**: 369.

Hobbes, T. (1651). Leviathan, Penguin Classics Edition 1982.

Holzmann, R. (1994). "Funded and private pensions for Eastern European countries in transition?" Revista de Análisis Económico–Economic Analysis Review **9**(1): 183-210.

Holzmann, R. (1996). "Pension reform, financial market development, and economic growth: preliminary evidence from Chile."

Holzmann, R. (1997). "Fiscal alternatives of moving from unfunded to funded pensions."

Holzmann, R. (2005). Old-age income support in the 21st century: An international perspective on pension systems and reform, World Bank Publications.

Holzmann, R., et al. (2004). Implicit pension debt: Issues, measurement and scope in international perspective, Social Protection, Labor Markets, Pensions, Social Assistance, World Bank.

Hombek, R. (2009). Apparatus and method for tax collection, Google Patents.

IMF (1995). "World Economic Outlook."

Jackman, R., et al. (1996). "Combatting unemployment: Is flexibility enough?".

Jain, A. K. (2007). "Technology: biometric recognition." Nature **449**(7158): 38-40.

James, E. (1995). "Averting the old age crisis." Ageing International **22**(2): 15-22.

James, S. and A. Edwards (2010). "An annotated bibliography of tax compliance and tax compliance costs."

Johansson, Å., . and et al. (2008). Taxation and Economic Growth, OECD Publishing.

Johnson, E. J. and D. Goldstein (2003). "Do defaults save lives?" SCIENCE-NEW YORK THEN WASHINGTON-: 1338-1339.

Kaldor, N. (1955). Expenditure tax, Routledge.

Keen, M. (2008). "VAT, tariffs, and withholding: Border taxes and informality in developing countries." Journal of Public Economics **92**(10): 1892-1906.

Keen, M. and B. Lockwood (2010). "The value added tax: Its causes and consequences." Journal of Development Economics **92**(2): 138-151.

Krusell, P., et al. (1996). "Are consumption taxes really better than income taxes?" Journal of Monetary Economics **37**(3): 475-503.

Levy, S. (2010). Good intentions, bad outcomes: Social policy, informality, and economic growth in Mexico, Brookings Institution Press.

Lopes, C. M. M. (2008). "Quanto custa pagar impostos em Portugal?–Os custos de cumprimento da tributação do rendimento." Almedina, Coimbra.

Mace, R. (2014). "When not to have another baby: An evolutionary approach to low fertility." Demographic Research **30**(37): 1074-1096.

Markowitz, H. M. (1968). Portfolio selection: efficient diversification of investments, Yale university press.

McCaffery, E. J. (2002). Fair Not Flat, Chicago, IL: University of Chicago Press.

McCaffery, E. J. (2008). Fair not flat: How to make the tax system better and simpler, University of Chicago Press.

Mill, J. S. (1871). Principles of political economy, Prometheus Books Edition 2004.

Mink, R. (2008). "General government pension obligations in Europe." IPM24 with IAOS: Measuring productivity: 199.

Mirrlees, J. A. (1971). "An exploration in the theory of optimum income taxation." The review of economic studies: 175-208.

Naritomi, J. (2013). Consumers as Tax Auditors, Working Paper, Harvard University.

O'Donoghue, T. and M. Rabin (1999). "Doing it now or later." American Economic Review: 103-124.

OECD (2006). "MACROECONOMIC EFFECTS OF A SHIFT FROM DIRECT TO INDIRECT TAXATION: A SIMULATION FOR 15 EU MEMBER STATES."

OECD (2013a). Pensions at a Glance 2013: OECD and G20 Indicators, OECD Publishing.

OECD (2014a). Total fertility rates, OECD Publishing.

OECD (2014c). OECD Pensions Outlook 2014, OECD Publishing.

OECD (2014d). Taxing Wages 2014, OECD Publishing.

OECD (2014e). Consumption Tax Trends 2014, OECD Publishing.

OECD and K. I. o. P. F. KIPF (2014). The Distributional Effects of Consumption Taxes in OECD Countries, OECD Publishing.

Ormaechea, S. A. and J. Yoo (2012). Tax Composition and Growth, International Monetary Fund.

Padovano, F. and E. Galli (2001). "Tax rates and economic growth in the OECD countries." Economic Inquiry **39**(1): 44-57.

Peters, E. (2008b). "Numeracy and the perception and communication of risk." Annals of the New York Academy of Sciences **1128**(1): 1-7.

Peters, E., et al. (2010a). "Aging-related changes in decision making." The aging consumer: Perspectives from psychology and economics: 75-101.

Picos-Sánchez, F. (2011). Consumption Taxation as an Additional Burden on Labour Income, OECD Publishing.

Piñera, J. (1991). "El cascabel al gato." Santiago: Editorial Zig Zag.

Pinto, J. A. P. (2011). Fiscalidade, Areal Editores,.

Ponds, E., et al. (2011). Funding in Public Sector Pension Plans-International Evidence, National Bureau of Economic Research.

Pordes, A. (1994). "Averting the old age crisis: Policies to protect the old and promote growth." World Bank. New York: Oxford University Press.

Poterba, J., et al. (2006). Lifecycle asset allocation strategies and the distribution of 401 (k) retirement wealth, National Bureau of Economic Research.

Poterba, J. M. (1996). "Retail price reactions to changes in state and local sales taxes." National Tax Journal: 165-176.

Rebiere, T. (2013). Incidence of a" social VAT" reform: A French scenario, Discussion Paper Series, Forschungsinstitut zur Zukunft der Arbeit.

Riedl, A. and F. Van Winden (2012). "Input versus output taxation in an experimental international economy." European Economic Review **56**(2): 216-232.

Schneider, F. (2013). "The Shadow Economy in Europe 2013. AT Kearney." Inc. sa.

Shiller, R. J. (2005). The life-cycle personal accounts proposal for social security: A review, National Bureau of Economic Research.

Thomas, A. and F. Picos-Sánchez (2012). Shifting from Social Security Contributions to Consumption Taxes, OECD Publishing.

Thomsen, G. J. and J. V. Andersen (2007). "Longevity Bonds–a Financial Market Instrument to Manage Longevity Risk." Danmarks Nationalbank Monetary Review 4th Quarter: 2.

Toder, E. and J. Rosenberg (2010). Effects of Imposing a Value-Added Tax to Replace Payroll Taxes or Corporate Taxes, Tax Policy Center Publication (April 7). Available at www. taxpolicycenter. org (accessed on November 9, 2014).

Turner, J. A. (1998). Retirement Income Systems for Different Economic, Demogrpahic and Political Environments, Organisation for Economic Co-operation and Development.

Ufier, A. (2014). "QUASI-EXPERIMENTAL ANALYSIS ON THE EFFECTS OF ADOPTION OF A VALUE ADDED TAX." Economic Inquiry.

United Nations, D. o. E. a. S. A., Population Division (2013). "World Population Ageing."

Yaari, M. E. (1965). "Uncertain lifetime, life insurance, and the theory of the consumer." The review of economic studies: 137-150.

Yermo, J. (2007). Reforming the Valuation and Funding of Pension Promises, OECD Publishing.

Website

http://info.portaldasfinancas.gov.pt/pt/docs/Conteudos_1pagina/NEWS_Portuguese_Tax_System.htm_m ,last accessed on 01 June 2015

http://www.oecd.org/eco/outlook/economicoutlookannextables.htm ,last accessed on 01 June 2015

http://ec.europa.eu/europe2020/pdf/themes/02_taxation.pdf ,last accessed on November 25, 2014

http://www.portugal.gov.pt/en/the-ministries/minister-of-the-presidency-and-of-parliamentary-affairs/keep-updated/20140102-cm-paef.aspx last accessed on November 25, 2014

https://stats.oecd.org/Index.aspx?DataSetCode=QASA_TABLE7PSD ,last accessed on November 25, 2014

http://www.kiwisaver.govt.nz/ ,last accessed on November 25, 2014

http://ec.europa.eu/taxation_customs/taxation/excise_duties/index_en.htm ,last accessed on September, 2015

http://info.portaldasfinancas.gov.pt/pt/docs/Conteudos_1pagina/NEWS_Portuguese_Tax_System.htm ,last accessed on September, 2015

Appendices

Appendix 1: Calculation of the future pension for a retiree in 45 years

Month	M Salary	M Contr	Salaries inc	BMR	SMR	Return	Intial Capital	Final Capital
1	1.235,67 €	345,99 €	0%	0,15%	0,42%	0,99 €	345,99 €	346,98 €
2	1.235,67 €	345,99 €	0%	0,15%	0,42%	1,98 €	692,96 €	694,95 €
3	1.235,67 €	345,99 €	0%	0,15%	0,42%	2,98 €	1.040,93 €	1.043,91 €
4	1.235,67 €	345,99 €	0%	0,15%	0,42%	3,98 €	1.389,90 €	1.393,87 €
5	1.235,67 €	345,99 €	0%	0,15%	0,42%	4,98 €	1.739,86 €	1.744,84 €
6	1.235,67 €	345,99 €	0%	0,15%	0,42%	5,98 €	2.090,82 €	2.096,80 €
7	1.235,67 €	345,99 €	0%	0,15%	0,42%	6,99 €	2.442,79 €	2.449,78 €
8	1.235,67 €	345,99 €	0%	0,15%	0,42%	8,00 €	2.795,76 €	2.803,76 €
9	1.235,67 €	345,99 €	0%	0,15%	0,42%	9,01 €	3.149,75 €	3.158,76 €
10	1.235,67 €	345,99 €	0%	0,15%	0,42%	10,03 €	3.504,75 €	3.514,77 €
11	1.235,67 €	345,99 €	0%	0,15%	0,42%	11,04 €	3.860,76 €	3.871,80 €
12	1.235,67 €	345,99 €	0%	0,15%	0,42%	12,07 €	4.217,79 €	4.229,85 €
13	1.248,02 €	349,45 €	1%	0,15%	0,42%	13,10 €	4.579,30 €	4.592,40 €
14	1.248,02 €	349,45 €	0%	0,15%	0,42%	14,14 €	4.941,85 €	4.955,98 €
15	1.248,02 €	349,45 €	0%	0,15%	0,42%	15,18 €	5.305,43 €	5.320,61 €
16	1.248,02 €	349,45 €	0%	0,15%	0,42%	16,22 €	5.670,05 €	5.686,27 €
17	1.248,02 €	349,45 €	0%	0,15%	0,42%	17,27 €	6.035,72 €	6.052,98 €
18	1.248,02 €	349,45 €	0%	0,15%	0,42%	18,31 €	6.402,43 €	6.420,74 €
19	1.248,02 €	349,45 €	0%	0,15%	0,42%	19,37 €	6.770,19 €	6.789,56 €
20	1.248,02 €	349,45 €	0%	0,15%	0,42%	20,42 €	7.139,00 €	7.159,43 €
21	1.248,02 €	349,45 €	0%	0,15%	0,42%	21,48 €	7.508,87 €	7.530,35 €
22	1.248,02 €	349,45 €	0%	0,15%	0,42%	22,54 €	7.879,80 €	7.902,34 €
23	1.248,02 €	349,45 €	0%	0,15%	0,42%	23,60 €	8.251,79 €	8.275,39 €
24	1.248,02 €	349,45 €	0%	0,15%	0,42%	24,67 €	8.624,84 €	8.649,51 €
25	1.248,02 €	349,45 €	0%	0,15%	0,42%	25,74 €	8.998,96 €	9.024,70 €
26	1.260,50 €	352,94 €	1%	0,15%	0,42%	26,83 €	9.377,64 €	9.404,46 €
27	1.260,50 €	352,94 €	0%	0,15%	0,42%	27,91 €	9.757,40 €	9.785,32 €
28	1.260,50 €	352,94 €	0%	0,15%	0,42%	29,00 €	10.138,26 €	10.167,26 €
29	1.260,50 €	352,94 €	0%	0,15%	0,42%	30,09 €	10.520,20 €	10.550,29 €
30	1.260,50 €	352,94 €	0%	0,15%	0,42%	31,19 €	10.903,23 €	10.934,42 €
31	1.260,50 €	352,94 €	0%	0,15%	0,42%	32,29 €	11.287,36 €	11.319,65 €
32	1.260,50 €	352,94 €	0%	0,15%	0,42%	33,39 €	11.672,59 €	11.705,98 €
33	1.260,50 €	352,94 €	0%	0,15%	0,42%	34,50 €	12.058,93 €	12.093,42 €
34	1.260,50 €	352,94 €	0%	0,15%	0,42%	35,60 €	12.446,36 €	12.481,97 €
35	1.260,50 €	352,94 €	0%	0,15%	0,42%	36,72 €	12.834,91 €	12.871,62 €
36	1.260,50 €	352,94 €	0%	0,15%	0,42%	37,83 €	13.224,56 €	13.262,39 €
37	1.260,50 €	352,94 €	0%	0,15%	0,42%	38,95 €	13.615,33 €	13.654,28 €
38	1.260,50 €	352,94 €	0%	0,15%	0,42%	40,07 €	14.007,22 €	14.047,29 €
39	1.273,11 €	356,47 €	1%	0,15%	0,42%	41,20 €	14.403,76 €	14.444,96 €
40	1.273,11 €	356,47 €	0%	0,15%	0,42%	42,34 €	14.801,43 €	14.843,77 €
41	1.273,11 €	356,47 €	0%	0,15%	0,42%	43,48 €	15.200,24 €	15.243,73 €
42	1.273,11 €	356,47 €	0%	0,15%	0,42%	44,63 €	15.600,20 €	15.644,82 €
43	1.273,11 €	356,47 €	0%	0,15%	0,42%	45,77 €	16.001,29 €	16.047,06 €
44	1.273,11 €	356,47 €	0%	0,15%	0,42%	46,92 €	16.403,54 €	16.450,46 €
45	1.273,11 €	356,47 €	0%	0,15%	0,42%	48,08 €	16.806,93 €	16.855,01 €
46	1.273,11 €	356,47 €	0%	0,15%	0,42%	49,23 €	17.211,48 €	17.260,71 €
47	1.273,11 €	356,47 €	0%	0,15%	0,42%	50,40 €	17.617,18 €	17.667,58 €
48	1.273,11 €	356,47 €	0%	0,15%	0,42%	51,56 €	18.024,05 €	18.075,61 €
49	1.273,11 €	356,47 €	0%	0,15%	0,42%	52,73 €	18.432,08 €	18.484,80 €
50	1.273,11 €	356,47 €	0%	0,15%	0,42%	53,90 €	18.841,27 €	18.895,17 €
51	1.273,11 €	356,47 €	0%	0,15%	0,42%	55,07 €	19.251,64 €	19.306,71 €

52	1.285,84 €	360,04 €	1%	0,15%	0,42%	56,26 €	19.666,75 €	19.723,00 €
53	1.285,84 €	360,04 €	0%	0,15%	0,42%	57,45 €	20.083,04 €	20.140,49 €
54	1.285,84 €	360,04 €	0%	0,15%	0,42%	58,64 €	20.500,52 €	20.559,17 €
55	1.285,84 €	360,04 €	0%	0,15%	0,42%	59,84 €	20.919,20 €	20.979,04 €
56	1.285,84 €	360,04 €	0%	0,15%	0,42%	61,04 €	21.339,08 €	21.400,12 €
57	1.285,84 €	360,04 €	0%	0,15%	0,42%	62,25 €	21.760,15 €	21.822,40 €
58	1.285,84 €	360,04 €	0%	0,15%	0,42%	63,45 €	22.182,43 €	22.245,89 €
59	1.285,84 €	360,04 €	0%	0,15%	0,42%	64,67 €	22.605,92 €	22.670,59 €
60	1.285,84 €	360,04 €	0%	0,15%	0,42%	65,88 €	23.030,62 €	23.096,51 €
61	1.285,84 €	360,04 €	0%	0,15%	0,42%	67,10 €	23.456,54 €	23.523,64 €
62	1.285,84 €	360,04 €	0%	0,15%	0,42%	68,32 €	23.883,67 €	23.952,00 €
63	1.285,84 €	360,04 €	0%	0,15%	0,42%	69,55 €	24.312,03 €	24.381,58 €
64	1.285,84 €	360,04 €	0%	0,15%	0,42%	70,77 €	24.741,61 €	24.812,39 €
65	1.298,70 €	363,64 €	1%	0,15%	0,42%	72,02 €	25.176,02 €	25.248,04 €
66	1.298,70 €	363,64 €	0%	0,15%	0,42%	73,26 €	25.611,68 €	25.684,94 €
67	1.298,70 €	363,64 €	0%	0,15%	0,42%	74,51 €	26.048,57 €	26.123,09 €
68	1.298,70 €	363,64 €	0%	0,15%	0,42%	75,77 €	26.486,72 €	26.562,49 €
69	1.298,70 €	363,64 €	0%	0,15%	0,42%	77,02 €	26.926,13 €	27.003,15 €
70	1.298,70 €	363,64 €	0%	0,15%	0,42%	78,28 €	27.366,79 €	27.445,07 €
71	1.298,70 €	363,64 €	0%	0,15%	0,42%	79,55 €	27.808,71 €	27.888,25 €
72	1.298,70 €	363,64 €	0%	0,15%	0,42%	80,82 €	28.251,89 €	28.332,71 €
73	1.298,70 €	363,64 €	0%	0,15%	0,42%	82,09 €	28.696,34 €	28.778,43 €
74	1.298,70 €	363,64 €	0%	0,15%	0,42%	83,36 €	29.142,06 €	29.225,43 €
75	1.298,70 €	363,64 €	0%	0,15%	0,42%	84,64 €	29.589,06 €	29.673,70 €
76	1.298,70 €	363,64 €	0%	0,15%	0,42%	85,92 €	30.037,34 €	30.123,26 €
77	1.298,70 €	363,64 €	0%	0,15%	0,42%	87,21 €	30.486,90 €	30.574,11 €
78	1.311,69 €	367,27 €	1%	0,15%	0,42%	88,51 €	30.941,38 €	31.029,89 €
79	1.311,69 €	367,27 €	0%	0,15%	0,42%	89,81 €	31.397,16 €	31.486,98 €
80	1.311,69 €	367,27 €	0%	0,15%	0,42%	91,12 €	31.854,25 €	31.945,37 €
81	1.311,69 €	367,27 €	0%	0,15%	0,42%	92,43 €	32.312,64 €	32.405,07 €
82	1.311,69 €	367,27 €	0%	0,15%	0,42%	93,75 €	32.772,34 €	32.866,09 €
83	1.311,69 €	367,27 €	0%	0,15%	0,42%	95,07 €	33.233,36 €	33.328,43 €
84	1.311,69 €	367,27 €	0%	0,15%	0,42%	96,39 €	33.695,70 €	33.792,09 €
85	1.311,69 €	367,27 €	0%	0,15%	0,42%	97,72 €	34.159,36 €	34.257,08 €
86	1.311,69 €	367,27 €	0%	0,15%	0,42%	99,05 €	34.624,35 €	34.723,39 €
87	1.311,69 €	367,27 €	0%	0,15%	0,42%	100,38 €	35.090,67 €	35.191,04 €
88	1.311,69 €	367,27 €	0%	0,15%	0,42%	101,72 €	35.558,32 €	35.660,03 €
89	1.311,69 €	367,27 €	0%	0,15%	0,42%	103,06 €	36.027,31 €	36.130,36 €
90	1.311,69 €	367,27 €	0%	0,15%	0,42%	104,40 €	36.497,64 €	36.602,04 €
91	1.324,80 €	370,94 €	1%	0,15%	0,42%	105,76 €	36.972,98 €	37.078,75 €
92	1.324,80 €	370,94 €	0%	0,15%	0,42%	107,13 €	37.449,69 €	37.556,82 €
93	1.324,80 €	370,94 €	0%	0,15%	0,42%	108,49 €	37.927,76 €	38.036,26 €
94	1.324,80 €	370,94 €	0%	0,15%	0,42%	109,87 €	38.407,20 €	38.517,07 €
95	1.324,80 €	370,94 €	0%	0,15%	0,42%	111,24 €	38.888,01 €	38.999,26 €
96	1.324,80 €	370,94 €	0%	0,15%	0,42%	112,62 €	39.370,20 €	39.482,82 €
97	1.324,80 €	370,94 €	0%	0,15%	0,42%	114,00 €	39.853,77 €	39.967,77 €
98	1.324,80 €	370,94 €	0%	0,15%	0,42%	115,39 €	40.338,71 €	40.454,11 €
99	1.324,80 €	370,94 €	0%	0,15%	0,42%	116,78 €	40.825,05 €	40.941,83 €
100	1.324,80 €	370,94 €	0%	0,15%	0,42%	118,18 €	41.312,78 €	41.430,96 €
101	1.324,80 €	370,94 €	0%	0,15%	0,42%	119,58 €	41.801,90 €	41.921,48 €
102	1.324,80 €	370,94 €	0%	0,15%	0,42%	120,98 €	42.292,42 €	42.413,40 €
103	1.324,80 €	370,94 €	0%	0,15%	0,42%	122,39 €	42.784,35 €	42.906,73 €
104	1.338,05 €	374,65 €	1%	0,15%	0,42%	123,81 €	43.281,39 €	43.405,20 €
105	1.338,05 €	374,65 €	0%	0,15%	0,42%	125,24 €	43.779,85 €	43.905,09 €
106	1.338,05 €	374,65 €	0%	0,15%	0,42%	126,67 €	44.279,74 €	44.406,40 €
107	1.338,05 €	374,65 €	0%	0,15%	0,42%	128,10 €	44.781,06 €	44.909,16 €

108	1.338,05 €	374,65 €	0%	0,15%	0,42%	129,54 €	45.283,81 €	45.413,35 €
109	1.338,05 €	374,65 €	0%	0,15%	0,42%	130,98 €	45.788,00 €	45.918,98 €
110	1.338,05 €	374,65 €	0%	0,15%	0,42%	132,43 €	46.293,64 €	46.426,06 €
111	1.338,05 €	374,65 €	0%	0,15%	0,42%	133,88 €	46.800,72 €	46.934,59 €
112	1.338,05 €	374,65 €	0%	0,15%	0,42%	135,33 €	47.309,25 €	47.444,58 €
113	1.338,05 €	374,65 €	0%	0,15%	0,42%	136,79 €	47.819,23 €	47.956,02 €
114	1.338,05 €	374,65 €	0%	0,15%	0,42%	138,25 €	48.330,68 €	48.468,93 €
115	1.338,05 €	374,65 €	0%	0,15%	0,42%	139,72 €	48.843,58 €	48.983,30 €
116	1.338,05 €	374,65 €	0%	0,15%	0,42%	141,19 €	49.357,96 €	49.499,15 €
117	1.351,43 €	378,40 €	1%	0,15%	0,42%	142,68 €	49.877,55 €	50.020,23 €
118	1.351,43 €	378,40 €	0%	0,15%	0,42%	144,17 €	50.398,63 €	50.542,80 €
119	1.351,43 €	378,40 €	0%	0,15%	0,42%	145,66 €	50.921,20 €	51.066,86 €
120	1.351,43 €	378,40 €	0%	0,15%	0,42%	147,16 €	51.445,26 €	51.592,42 €
121	1.351,43 €	378,40 €	0%	0,15%	0,42%	148,67 €	51.970,82 €	52.119,49 €
122	1.351,43 €	378,40 €	0%	0,15%	0,42%	150,17 €	52.497,89 €	52.648,06 €
123	1.351,43 €	378,40 €	0%	0,15%	0,42%	151,69 €	53.026,46 €	53.178,15 €
124	1.351,43 €	378,40 €	0%	0,15%	0,42%	153,20 €	53.556,55 €	53.709,75 €
125	1.351,43 €	378,40 €	0%	0,15%	0,42%	154,72 €	54.088,15 €	54.242,87 €
126	1.351,43 €	378,40 €	0%	0,15%	0,42%	156,25 €	54.621,27 €	54.777,52 €
127	1.351,43 €	378,40 €	0%	0,15%	0,42%	157,78 €	55.155,92 €	55.313,70 €
128	1.351,43 €	378,40 €	0%	0,15%	0,42%	159,31 €	55.692,10 €	55.851,41 €
129	1.351,43 €	378,40 €	0%	0,15%	0,42%	160,85 €	56.229,81 €	56.390,66 €
130	1.364,94 €	382,18 €	1%	0,15%	0,42%	162,40 €	56.772,85 €	56.935,25 €
131	1.364,94 €	382,18 €	0%	0,15%	0,42%	163,96 €	57.317,43 €	57.481,39 €
132	1.364,94 €	382,18 €	0%	0,15%	0,42%	165,52 €	57.863,58 €	58.029,10 €
133	1.364,94 €	382,18 €	0%	0,15%	0,42%	167,09 €	58.411,28 €	58.578,37 €
134	1.364,94 €	382,18 €	0%	0,15%	0,42%	168,66 €	58.960,56 €	59.129,22 €
135	1.364,94 €	382,18 €	0%	0,15%	0,42%	170,24 €	59.511,40 €	59.681,64 €
136	1.364,94 €	382,18 €	0%	0,15%	0,42%	171,82 €	60.063,82 €	60.235,64 €
137	1.364,94 €	382,18 €	0%	0,15%	0,42%	173,40 €	60.617,82 €	60.791,23 €
138	1.364,94 €	382,18 €	0%	0,15%	0,42%	174,99 €	61.173,41 €	61.348,40 €
139	1.364,94 €	382,18 €	0%	0,15%	0,42%	176,58 €	61.730,58 €	61.907,17 €
140	1.364,94 €	382,18 €	0%	0,15%	0,42%	178,18 €	62.289,35 €	62.467,54 €
141	1.364,94 €	382,18 €	0%	0,15%	0,42%	179,79 €	62.849,72 €	63.029,51 €
142	1.364,94 €	382,18 €	0%	0,15%	0,42%	181,39 €	63.411,69 €	63.593,08 €
143	1.378,59 €	386,01 €	1%	0,15%	0,42%	183,02 €	63.979,09 €	64.162,11 €
144	1.378,59 €	386,01 €	0%	0,15%	0,42%	184,64 €	64.548,11 €	64.732,76 €
145	1.378,59 €	386,01 €	0%	0,15%	0,42%	186,28 €	65.118,76 €	65.305,04 €
146	1.378,59 €	386,01 €	0%	0,15%	0,42%	187,91 €	65.691,05 €	65.878,96 €
147	1.378,59 €	386,01 €	0%	0,15%	0,42%	189,56 €	66.264,97 €	66.454,52 €
148	1.378,59 €	386,01 €	0%	0,15%	0,42%	191,20 €	66.840,53 €	67.031,73 €
149	1.378,59 €	386,01 €	0%	0,15%	0,42%	192,85 €	67.417,74 €	67.610,59 €
150	1.378,59 €	386,01 €	0%	0,15%	0,42%	194,51 €	67.996,59 €	68.191,10 €
151	1.378,59 €	386,01 €	0%	0,15%	0,42%	196,17 €	68.577,11 €	68.773,28 €
152	1.378,59 €	386,01 €	0%	0,15%	0,42%	197,83 €	69.159,29 €	69.357,12 €
153	1.378,59 €	386,01 €	0%	0,15%	0,42%	199,50 €	69.743,13 €	69.942,63 €
154	1.378,59 €	386,01 €	0%	0,15%	0,42%	201,18 €	70.328,64 €	70.529,82 €
155	1.378,59 €	386,01 €	0%	0,15%	0,42%	202,86 €	70.915,82 €	71.118,68 €
156	1.392,38 €	389,87 €	1%	0,15%	0,42%	204,55 €	71.508,55 €	71.713,10 €
157	1.392,38 €	389,87 €	0%	0,15%	0,42%	206,26 €	72.102,97 €	72.309,22 €
158	1.392,38 €	389,87 €	0%	0,15%	0,42%	207,96 €	72.699,09 €	72.907,05 €
159	1.392,38 €	389,87 €	0%	0,15%	0,42%	209,67 €	73.296,92 €	73.506,59 €
160	1.392,38 €	389,87 €	0%	0,15%	0,42%	211,39 €	73.896,45 €	74.107,84 €
161	1.392,38 €	389,87 €	0%	0,15%	0,42%	213,11 €	74.497,71 €	74.710,81 €
162	1.392,38 €	389,87 €	0%	0,15%	0,42%	214,83 €	75.100,68 €	75.315,51 €
163	1.392,38 €	389,87 €	0%	0,15%	0,42%	216,56 €	75.705,38 €	75.921,94 €

164	1.392,38 €	389,87 €	0%	0,15%	0,42%	218,29 €	76.311,80 €	76.530,10 €
165	1.392,38 €	389,87 €	0%	0,15%	0,42%	220,03 €	76.919,96 €	77.140,00 €
166	1.392,38 €	389,87 €	0%	0,15%	0,42%	221,78 €	77.529,86 €	77.751,64 €
167	1.392,38 €	389,87 €	0%	0,15%	0,42%	223,53 €	78.141,51 €	78.365,04 €
168	1.392,38 €	389,87 €	0%	0,15%	0,42%	225,28 €	78.754,90 €	78.980,19 €
169	1.406,30 €	393,77 €	1%	0,15%	0,42%	227,05 €	79.373,95 €	79.601,01 €
170	1.406,30 €	393,77 €	0%	0,15%	0,42%	228,83 €	79.994,77 €	80.223,60 €
171	1.406,30 €	393,77 €	0%	0,15%	0,42%	230,61 €	80.617,37 €	80.847,98 €
172	1.406,30 €	393,77 €	0%	0,15%	0,42%	232,40 €	81.241,74 €	81.474,14 €
173	1.406,30 €	393,77 €	0%	0,15%	0,42%	234,19 €	81.867,91 €	82.102,09 €
174	1.406,30 €	393,77 €	0%	0,15%	0,42%	235,98 €	82.495,86 €	82.731,84 €
175	1.406,30 €	393,77 €	0%	0,15%	0,42%	237,79 €	83.125,61 €	83.363,40 €
176	1.406,30 €	393,77 €	0%	0,15%	0,42%	239,59 €	83.757,16 €	83.996,75 €
177	1.406,30 €	393,77 €	0%	0,15%	0,42%	241,40 €	84.390,52 €	84.631,92 €
178	1.406,30 €	393,77 €	0%	0,15%	0,42%	243,22 €	85.025,69 €	85.268,91 €
179	1.406,30 €	393,77 €	0%	0,15%	0,42%	245,04 €	85.662,67 €	85.907,72 €
180	1.406,30 €	393,77 €	0%	0,15%	0,42%	246,87 €	86.301,48 €	86.548,35 €
181	1.406,30 €	393,77 €	0%	0,15%	0,42%	248,70 €	86.942,12 €	87.190,82 €
182	1.420,37 €	397,70 €	1%	0,15%	0,42%	250,55 €	87.588,53 €	87.839,08 €
183	1.420,37 €	397,70 €	0%	0,15%	0,42%	252,41 €	88.236,78 €	88.489,19 €
184	1.420,37 €	397,70 €	0%	0,15%	0,42%	254,27 €	88.886,89 €	89.141,16 €
185	1.420,37 €	397,70 €	0%	0,15%	0,42%	256,13 €	89.538,86 €	89.794,99 €
186	1.420,37 €	397,70 €	0%	0,15%	0,42%	258,00 €	90.192,69 €	90.450,70 €
187	1.420,37 €	397,70 €	0%	0,15%	0,42%	259,88 €	90.848,40 €	91.108,28 €
188	1.420,37 €	397,70 €	0%	0,15%	0,42%	261,76 €	91.505,98 €	91.767,74 €
189	1.420,37 €	397,70 €	0%	0,15%	0,42%	263,65 €	92.165,44 €	92.429,09 €
190	1.420,37 €	397,70 €	0%	0,15%	0,42%	265,54 €	92.826,79 €	93.092,33 €
191	1.420,37 €	397,70 €	0%	0,15%	0,42%	267,43 €	93.490,03 €	93.757,46 €
192	1.420,37 €	397,70 €	0%	0,15%	0,42%	269,34 €	94.155,16 €	94.424,50 €
193	1.420,37 €	397,70 €	0%	0,15%	0,42%	271,24 €	94.822,20 €	95.093,45 €
194	1.420,37 €	397,70 €	0%	0,15%	0,42%	273,16 €	95.491,15 €	95.764,31 €
195	1.434,57 €	401,68 €	1%	0,15%	0,42%	275,09 €	96.165,99 €	96.441,08 €
196	1.434,57 €	401,68 €	0%	0,15%	0,42%	277,02 €	96.842,76 €	97.119,78 €
197	1.434,57 €	401,68 €	0%	0,15%	0,42%	278,97 €	97.521,46 €	97.800,43 €
198	1.434,57 €	401,68 €	0%	0,15%	0,42%	280,91 €	98.202,11 €	98.483,02 €
199	1.434,57 €	401,68 €	0%	0,15%	0,42%	282,87 €	98.884,70 €	99.167,57 €
200	1.434,57 €	401,68 €	0%	0,15%	0,42%	284,82 €	99.569,25 €	99.854,07 €
201	1.434,57 €	401,68 €	0%	0,15%	0,42%	286,79 €	100.255,75 €	100.542,54 €
202	1.434,57 €	401,68 €	0%	0,15%	0,42%	288,76 €	100.944,22 €	101.232,98 €
203	1.434,57 €	401,68 €	0%	0,15%	0,42%	290,73 €	101.634,66 €	101.925,39 €
204	1.434,57 €	401,68 €	0%	0,15%	0,42%	292,71 €	102.327,07 €	102.619,78 €
205	1.434,57 €	401,68 €	0%	0,15%	0,42%	294,70 €	103.021,46 €	103.316,16 €
206	1.434,57 €	401,68 €	0%	0,15%	0,42%	296,69 €	103.717,84 €	104.014,53 €
207	1.434,57 €	401,68 €	0%	0,15%	0,42%	298,69 €	104.416,21 €	104.714,90 €
208	1.448,92 €	405,70 €	1%	0,15%	0,42%	300,70 €	105.120,60 €	105.421,30 €
209	1.448,92 €	405,70 €	0%	0,15%	0,42%	302,72 €	105.827,00 €	106.129,72 €
210	1.448,92 €	405,70 €	0%	0,15%	0,42%	304,75 €	106.535,42 €	106.840,17 €
211	1.448,92 €	405,70 €	0%	0,15%	0,42%	306,78 €	107.245,87 €	107.552,65 €
212	1.448,92 €	405,70 €	0%	0,15%	0,42%	308,82 €	107.958,35 €	108.267,17 €
213	1.448,92 €	405,70 €	0%	0,15%	0,42%	310,87 €	108.672,87 €	108.983,73 €
214	1.448,92 €	405,70 €	0%	0,15%	0,42%	312,92 €	109.389,43 €	109.702,35 €
215	1.448,92 €	405,70 €	0%	0,15%	0,42%	314,97 €	110.108,04 €	110.423,01 €
216	1.448,92 €	405,70 €	0%	0,15%	0,42%	317,03 €	110.828,71 €	111.145,74 €
217	1.448,92 €	405,70 €	0%	0,15%	0,42%	319,10 €	111.551,44 €	111.870,54 €
218	1.448,92 €	405,70 €	0%	0,15%	0,42%	321,17 €	112.276,24 €	112.597,41 €
219	1.448,92 €	405,70 €	0%	0,15%	0,42%	323,25 €	113.003,11 €	113.326,36 €

220	1.448,92 €	405,70 €	0%	0,15%	0,42%	325,34 €	113.732,05 €	114.057,39 €
221	1.463,41 €	409,75 €	1%	0,15%	0,42%	327,44 €	114.467,15 €	114.794,59 €
222	1.463,41 €	409,75 €	0%	0,15%	0,42%	329,55 €	115.204,34 €	115.533,89 €
223	1.463,41 €	409,75 €	0%	0,15%	0,42%	331,66 €	115.943,64 €	116.275,31 €
224	1.463,41 €	409,75 €	0%	0,15%	0,42%	333,79 €	116.685,06 €	117.018,85 €
225	1.463,41 €	409,75 €	0%	0,15%	0,42%	335,91 €	117.428,60 €	117.764,51 €
226	1.463,41 €	409,75 €	0%	0,15%	0,42%	338,04 €	118.174,26 €	118.512,31 €
227	1.463,41 €	409,75 €	0%	0,15%	0,42%	340,18 €	118.922,06 €	119.262,25 €
228	1.463,41 €	409,75 €	0%	0,15%	0,42%	342,33 €	119.672,00 €	120.014,33 €
229	1.463,41 €	409,75 €	0%	0,15%	0,42%	344,48 €	120.424,08 €	120.768,56 €
230	1.463,41 €	409,75 €	0%	0,15%	0,42%	346,64 €	121.178,32 €	121.524,96 €
231	1.463,41 €	409,75 €	0%	0,15%	0,42%	348,80 €	121.934,71 €	122.283,51 €
232	1.463,41 €	409,75 €	0%	0,15%	0,42%	350,97 €	122.693,27 €	123.044,24 €
233	1.463,41 €	409,75 €	0%	0,15%	0,42%	353,15 €	123.453,99 €	123.807,14 €
234	1.478,04 €	413,85 €	1%	0,15%	0,42%	355,34 €	124.220,99 €	124.576,33 €
235	1.478,04 €	413,85 €	0%	0,15%	0,42%	357,54 €	124.990,18 €	125.347,73 €
236	1.478,04 €	413,85 €	0%	0,15%	0,42%	359,75 €	125.761,58 €	126.121,33 €
237	1.478,04 €	413,85 €	0%	0,15%	0,42%	361,96 €	126.535,18 €	126.897,14 €
238	1.478,04 €	413,85 €	0%	0,15%	0,42%	364,18 €	127.310,99 €	127.675,17 €
239	1.478,04 €	413,85 €	0%	0,15%	0,42%	366,41 €	128.089,02 €	128.455,43 €
240	1.478,04 €	413,85 €	0%	0,15%	0,42%	368,64 €	128.869,28 €	129.237,92 €
241	1.478,04 €	413,85 €	0%	0,15%	0,42%	370,88 €	129.651,77 €	130.022,65 €
242	1.478,04 €	413,85 €	0%	0,15%	0,42%	373,12 €	130.436,50 €	130.809,62 €
243	1.478,04 €	413,85 €	0%	0,15%	0,42%	375,37 €	131.223,47 €	131.598,84 €
244	1.478,04 €	413,85 €	0%	0,15%	0,42%	377,63 €	132.012,69 €	132.390,33 €
245	1.478,04 €	413,85 €	0%	0,15%	0,42%	379,89 €	132.804,18 €	133.184,07 €
246	1.478,04 €	413,85 €	0%	0,15%	0,42%	382,17 €	133.597,92 €	133.980,09 €
247	1.492,82 €	417,99 €	1%	0,15%	0,42%	384,45 €	134.398,08 €	134.782,53 €
248	1.492,82 €	417,99 €	0%	0,15%	0,42%	386,75 €	135.200,52 €	135.587,27 €
249	1.492,82 €	417,99 €	0%	0,15%	0,42%	389,05 €	136.005,26 €	136.394,31 €
250	1.492,82 €	417,99 €	0%	0,15%	0,42%	391,36 €	136.812,30 €	137.203,66 €
251	1.492,82 €	417,99 €	0%	0,15%	0,42%	393,68 €	137.621,65 €	138.015,33 €
252	1.492,82 €	417,99 €	0%	0,15%	0,42%	396,00 €	138.433,32 €	138.829,31 €
253	1.492,82 €	417,99 €	0%	0,15%	0,42%	398,33 €	139.247,30 €	139.645,63 €
254	1.492,82 €	417,99 €	0%	0,15%	0,42%	400,66 €	140.063,62 €	140.464,28 €
255	1.492,82 €	417,99 €	0%	0,15%	0,42%	403,00 €	140.882,27 €	141.285,27 €
256	1.492,82 €	417,99 €	0%	0,15%	0,42%	405,35 €	141.703,26 €	142.108,61 €
257	1.492,82 €	417,99 €	0%	0,15%	0,42%	407,71 €	142.526,60 €	142.934,31 €
258	1.492,82 €	417,99 €	0%	0,15%	0,42%	410,07 €	143.352,30 €	143.762,37 €
259	1.492,82 €	417,99 €	0%	0,15%	0,42%	412,44 €	144.180,36 €	144.592,79 €
260	1.507,75 €	422,17 €	1%	0,15%	0,42%	414,82 €	145.014,96 €	145.429,79 €
261	1.507,75 €	422,17 €	0%	0,15%	0,42%	417,22 €	145.851,96 €	146.269,18 €
262	1.507,75 €	422,17 €	0%	0,15%	0,42%	419,62 €	146.691,34 €	147.110,96 €
263	1.507,75 €	422,17 €	0%	0,15%	0,42%	422,03 €	147.533,13 €	147.955,16 €
264	1.507,75 €	422,17 €	0%	0,15%	0,42%	424,44 €	148.377,33 €	148.801,77 €
265	1.507,75 €	422,17 €	0%	0,15%	0,42%	426,86 €	149.223,94 €	149.650,81 €
266	1.507,75 €	422,17 €	0%	0,15%	0,42%	429,29 €	150.072,98 €	150.502,27 €
267	1.507,75 €	422,17 €	0%	0,15%	0,42%	431,73 €	150.924,44 €	151.356,17 €
268	1.507,75 €	422,17 €	0%	0,15%	0,42%	434,17 €	151.778,34 €	152.212,51 €
269	1.507,75 €	422,17 €	0%	0,15%	0,42%	436,62 €	152.634,68 €	153.071,30 €
270	1.507,75 €	422,17 €	0%	0,15%	0,42%	439,08 €	153.493,47 €	153.932,55 €
271	1.507,75 €	422,17 €	0%	0,15%	0,42%	441,54 €	154.354,72 €	154.796,26 €
272	1.507,75 €	422,17 €	0%	0,15%	0,42%	444,01 €	155.218,43 €	155.662,44 €
273	1.522,83 €	426,39 €	1%	0,15%	0,42%	446,50 €	156.088,83 €	156.535,33 €
274	1.522,83 €	426,39 €	0%	0,15%	0,42%	449,00 €	156.961,73 €	157.410,72 €
275	1.522,83 €	426,39 €	0%	0,15%	0,42%	451,50 €	157.837,12 €	158.288,62 €

276	1.522,83 €	426,39 €	0%	0,15%	0,42%	454,01 €	158.715,01 €	159.169,02 €
277	1.522,83 €	426,39 €	0%	0,15%	0,42%	456,53 €	159.595,42 €	160.051,95 €
278	1.522,83 €	426,39 €	0%	0,15%	0,42%	459,06 €	160.478,34 €	160.937,40 €
279	1.522,83 €	426,39 €	0%	0,15%	0,42%	461,59 €	161.363,79 €	161.825,38 €
280	1.522,83 €	426,39 €	0%	0,15%	0,42%	464,13 €	162.251,77 €	162.715,90 €
281	1.522,83 €	426,39 €	0%	0,15%	0,42%	466,68 €	163.142,29 €	163.608,97 €
282	1.522,83 €	426,39 €	0%	0,15%	0,42%	469,23 €	164.035,36 €	164.504,60 €
283	1.522,83 €	426,39 €	0%	0,15%	0,42%	471,80 €	164.930,99 €	165.402,79 €
284	1.522,83 €	426,39 €	0%	0,15%	0,42%	474,36 €	165.829,18 €	166.303,54 €
285	1.522,83 €	426,39 €	0%	0,15%	0,42%	476,94 €	166.729,93 €	167.206,87 €
286	1.538,05 €	430,66 €	1%	0,15%	0,42%	479,54 €	167.637,53 €	168.117,07 €
287	1.538,05 €	430,66 €	0%	0,15%	0,42%	482,14 €	168.547,72 €	169.029,86 €
288	1.538,05 €	430,66 €	0%	0,15%	0,42%	484,75 €	169.460,52 €	169.945,27 €
289	1.538,05 €	430,66 €	0%	0,15%	0,42%	487,37 €	170.375,93 €	170.863,30 €
290	1.538,05 €	430,66 €	0%	0,15%	0,42%	490,00 €	171.293,95 €	171.783,95 €
291	1.538,05 €	430,66 €	0%	0,15%	0,42%	492,63 €	172.214,60 €	172.707,24 €
292	1.538,05 €	430,66 €	0%	0,15%	0,42%	495,27 €	173.137,89 €	173.633,16 €
293	1.538,05 €	430,66 €	0%	0,15%	0,42%	497,92 €	174.063,82 €	174.561,74 €
294	1.538,05 €	430,66 €	0%	0,15%	0,42%	500,58 €	174.992,39 €	175.492,97 €
295	1.538,05 €	430,66 €	0%	0,15%	0,42%	503,24 €	175.923,63 €	176.426,87 €
296	1.538,05 €	430,66 €	0%	0,15%	0,42%	505,91 €	176.857,52 €	177.363,43 €
297	1.538,05 €	430,66 €	0%	0,15%	0,42%	508,59 €	177.794,09 €	178.302,68 €
298	1.538,05 €	430,66 €	0%	0,15%	0,42%	511,28 €	178.733,33 €	179.244,61 €
299	1.553,43 €	434,96 €	1%	0,15%	0,42%	513,98 €	179.679,57 €	180.193,56 €
300	**1.553,43 €**	**434,96 €**	**0%**	**0,15%**	**0,42%**	**516,70 €**	**180.628,52 €**	**181.145,22 €**
301	1.553,43 €	434,96 €	0%	0,15%	0,42%	519,42 €	181.580,18 €	182.099,60 €
302	1.553,43 €	434,96 €	0%	0,15%	0,42%	522,15 €	182.534,57 €	183.056,72 €
303	1.553,43 €	434,96 €	0%	0,15%	0,42%	524,89 €	183.491,68 €	184.016,57 €
304	1.553,43 €	434,96 €	0%	0,15%	0,42%	527,64 €	184.451,53 €	184.979,17 €
305	1.553,43 €	434,96 €	0%	0,15%	0,42%	530,39 €	185.414,13 €	185.944,52 €
306	1.553,43 €	434,96 €	0%	0,15%	0,42%	533,15 €	186.379,48 €	186.912,63 €
307	1.553,43 €	434,96 €	0%	0,15%	0,42%	535,92 €	187.347,59 €	187.883,51 €
308	1.553,43 €	434,96 €	0%	0,15%	0,42%	538,70 €	188.318,47 €	188.857,17 €
309	1.553,43 €	434,96 €	0%	0,15%	0,42%	541,48 €	189.292,13 €	189.833,61 €
310	1.553,43 €	434,96 €	0%	0,15%	0,42%	544,28 €	190.268,57 €	190.812,85 €
311	1.553,43 €	434,96 €	0%	0,15%	0,42%	547,08 €	191.247,81 €	191.794,89 €
312	1.568,97 €	439,31 €	1%	0,15%	0,42%	549,90 €	192.234,20 €	192.784,10 €
313	1.568,97 €	439,31 €	0%	0,15%	0,42%	552,73 €	193.223,41 €	193.776,14 €
314	1.568,97 €	439,31 €	0%	0,15%	0,42%	555,57 €	194.215,45 €	194.771,01 €
315	1.568,97 €	439,31 €	0%	0,15%	0,42%	558,41 €	195.210,32 €	195.768,74 €
316	1.568,97 €	439,31 €	0%	0,15%	0,42%	561,27 €	196.208,05 €	196.769,31 €
317	1.568,97 €	439,31 €	0%	0,15%	0,42%	564,13 €	197.208,62 €	197.772,75 €
318	1.568,97 €	439,31 €	0%	0,15%	0,42%	567,00 €	198.212,06 €	198.779,06 €
319	1.568,97 €	439,31 €	0%	0,15%	0,42%	569,88 €	199.218,37 €	199.788,25 €
320	1.568,97 €	439,31 €	0%	0,15%	0,42%	572,76 €	200.227,56 €	200.800,32 €
321	1.568,97 €	439,31 €	0%	0,15%	0,42%	575,66 €	201.239,63 €	201.815,29 €
322	1.568,97 €	439,31 €	0%	0,15%	0,42%	578,56 €	202.254,60 €	202.833,17 €
323	1.568,97 €	439,31 €	0%	0,15%	0,42%	581,47 €	203.272,48 €	203.853,95 €
324	1.568,97 €	439,31 €	0%	0,15%	0,42%	584,39 €	204.293,26 €	204.877,66 €
325	1.584,66 €	443,70 €	1%	0,15%	0,42%	587,33 €	205.321,36 €	205.908,70 €
326	1.584,66 €	443,70 €	0%	0,15%	0,42%	590,28 €	206.352,40 €	206.942,68 €
327	1.584,66 €	443,70 €	0%	0,15%	0,42%	593,24 €	207.386,39 €	207.979,63 €
328	1.584,66 €	443,70 €	0%	0,15%	0,42%	596,21 €	208.423,34 €	209.019,54 €
329	1.584,66 €	443,70 €	0%	0,15%	0,42%	599,18 €	209.463,25 €	210.062,43 €
330	1.584,66 €	443,70 €	0%	0,15%	0,42%	602,17 €	210.506,14 €	211.108,30 €
331	1.584,66 €	443,70 €	0%	0,15%	0,42%	605,16 €	211.552,01 €	212.157,16 €

332	1.584,66 €	443,70 €	0%	0,15%	0,42%	608,16 €	212.600,87 €	213.209,03 €
333	1.584,66 €	443,70 €	0%	0,15%	0,42%	611,17 €	213.652,73 €	214.263,90 €
334	1.584,66 €	443,70 €	0%	0,15%	0,42%	614,18 €	214.707,60 €	215.321,79 €
335	1.584,66 €	443,70 €	0%	0,15%	0,42%	617,21 €	215.765,49 €	216.382,70 €
336	1.584,66 €	443,70 €	0%	0,15%	0,42%	620,25 €	216.826,41 €	217.446,65 €
337	1.584,66 €	443,70 €	0%	0,15%	0,42%	623,29 €	217.890,36 €	218.513,65 €
338	1.600,51 €	448,14 €	1%	0,15%	0,42%	626,35 €	218.961,79 €	219.588,14 €
339	1.600,51 €	448,14 €	0%	0,15%	0,42%	629,43 €	220.036,28 €	220.665,71 €
340	1.600,51 €	448,14 €	0%	0,15%	0,42%	632,51 €	221.113,85 €	221.746,36 €
341	1.600,51 €	448,14 €	0%	0,15%	0,42%	635,60 €	222.194,50 €	222.830,11 €
342	1.600,51 €	448,14 €	0%	0,15%	0,42%	638,70 €	223.278,25 €	223.916,95 €
343	1.600,51 €	448,14 €	0%	0,15%	0,42%	641,81 €	224.365,09 €	225.006,90 €
344	1.600,51 €	448,14 €	0%	0,15%	0,42%	644,93 €	225.455,04 €	226.099,97 €
345	1.600,51 €	448,14 €	0%	0,15%	0,42%	648,06 €	226.548,11 €	227.196,17 €
346	1.600,51 €	448,14 €	0%	0,15%	0,42%	651,19 €	227.644,31 €	228.295,50 €
347	1.600,51 €	448,14 €	0%	0,15%	0,42%	654,34 €	228.743,64 €	229.397,98 €
348	1.600,51 €	448,14 €	0%	0,15%	0,42%	657,49 €	229.846,12 €	230.503,61 €
349	1.600,51 €	448,14 €	0%	0,15%	0,42%	660,65 €	230.951,75 €	231.612,40 €
350	1.600,51 €	448,14 €	0%	0,15%	0,42%	663,82 €	232.060,54 €	232.724,37 €
351	1.616,51 €	452,62 €	1%	0,15%	0,42%	667,02 €	233.176,99 €	233.844,01 €
352	1.616,51 €	452,62 €	0%	0,15%	0,42%	670,22 €	234.296,63 €	234.966,85 €
353	1.616,51 €	452,62 €	0%	0,15%	0,42%	673,43 €	235.419,47 €	236.092,91 €
354	1.616,51 €	452,62 €	0%	0,15%	0,42%	676,65 €	236.545,53 €	237.222,18 €
355	1.616,51 €	452,62 €	0%	0,15%	0,42%	679,88 €	237.674,80 €	238.354,69 €
356	1.616,51 €	452,62 €	0%	0,15%	0,42%	683,12 €	238.807,31 €	239.490,43 €
357	1.616,51 €	452,62 €	0%	0,15%	0,42%	686,37 €	239.943,06 €	240.629,43 €
358	1.616,51 €	452,62 €	0%	0,15%	0,42%	689,63 €	241.082,05 €	241.771,68 €
359	1.616,51 €	452,62 €	0%	0,15%	0,42%	692,90 €	242.224,31 €	242.917,20 €
360	**1.616,51 €**	**452,62 €**	**0%**	**0,15%**	**0,42%**	**696,17 €**	**243.369,83 €**	**244.066,00 €**
361	1.616,51 €	452,62 €	0%	0,15%	0,42%	699,46 €	244.518,62 €	245.218,09 €
362	1.616,51 €	452,62 €	0%	0,15%	0,42%	702,76 €	245.670,71 €	246.373,47 €
363	1.616,51 €	452,62 €	0%	0,15%	0,42%	706,06 €	246.826,09 €	247.532,15 €
364	1.632,68 €	457,15 €	1%	0,15%	0,42%	709,39 €	247.989,30 €	248.698,69 €
365	1.632,68 €	457,15 €	0%	0,15%	0,42%	712,73 €	249.155,84 €	249.868,56 €
366	1.632,68 €	457,15 €	0%	0,15%	0,42%	716,07 €	250.325,71 €	251.041,78 €
367	1.632,68 €	457,15 €	0%	0,15%	0,42%	719,43 €	251.498,93 €	252.218,36 €
368	1.632,68 €	457,15 €	0%	0,15%	0,42%	722,79 €	252.675,51 €	253.398,31 €
369	1.632,68 €	457,15 €	0%	0,15%	0,42%	726,17 €	253.855,45 €	254.581,62 €
370	1.632,68 €	457,15 €	0%	0,15%	0,42%	729,55 €	255.038,77 €	255.768,33 €
371	1.632,68 €	457,15 €	0%	0,15%	0,42%	732,95 €	256.225,48 €	256.958,43 €
372	1.632,68 €	457,15 €	0%	0,15%	0,42%	736,35 €	257.415,58 €	258.151,93 €
373	1.632,68 €	457,15 €	0%	0,15%	0,42%	739,77 €	258.609,08 €	259.348,85 €
374	1.632,68 €	457,15 €	0%	0,15%	0,42%	743,19 €	259.806,00 €	260.549,19 €
375	1.632,68 €	457,15 €	0%	0,15%	0,42%	746,63 €	261.006,34 €	261.752,96 €
376	1.632,68 €	457,15 €	0%	0,15%	0,42%	750,07 €	262.210,11 €	262.960,18 €
377	1.649,00 €	461,72 €	1%	0,15%	0,42%	753,54 €	263.421,90 €	264.175,43 €
378	1.649,00 €	461,72 €	0%	0,15%	0,42%	757,01 €	264.637,15 €	265.394,17 €
379	1.649,00 €	461,72 €	0%	0,15%	0,42%	760,50 €	265.855,89 €	266.616,38 €
380	1.649,00 €	461,72 €	0%	0,15%	0,42%	763,99 €	267.078,11 €	267.842,10 €
381	1.649,00 €	461,72 €	0%	0,15%	0,42%	767,50 €	268.303,82 €	269.071,32 €
382	1.649,00 €	461,72 €	0%	0,15%	0,42%	771,02 €	269.533,04 €	270.304,06 €
383	1.649,00 €	461,72 €	0%	0,15%	0,42%	774,54 €	270.765,78 €	271.540,32 €
384	1.649,00 €	461,72 €	0%	0,15%	0,42%	778,08 €	272.002,04 €	272.780,12 €
385	1.649,00 €	461,72 €	0%	0,15%	0,42%	781,63 €	273.241,84 €	274.023,47 €
386	1.649,00 €	461,72 €	0%	0,15%	0,42%	785,18 €	274.485,19 €	275.270,37 €
387	1.649,00 €	461,72 €	0%	0,15%	0,42%	788,75 €	275.732,09 €	276.520,84 €

388	1.649,00 €	461,72 €	0%	0,15%	0,42%	792,33 €	276.982,56 €	277.774,89 €
389	1.649,00 €	461,72 €	0%	0,15%	0,42%	795,91 €	278.236,61 €	279.032,52 €
390	1.665,49 €	466,34 €	1%	0,15%	0,42%	799,52 €	279.498,86 €	280.298,38 €
391	1.665,49 €	466,34 €	0%	0,15%	0,42%	803,15 €	280.764,72 €	281.567,86 €
392	1.665,49 €	466,34 €	0%	0,15%	0,42%	806,78 €	282.034,20 €	282.840,98 €
393	1.665,49 €	466,34 €	0%	0,15%	0,42%	810,42 €	283.307,32 €	284.117,74 €
394	1.665,49 €	466,34 €	0%	0,15%	0,42%	814,07 €	284.584,07 €	285.398,14 €
395	1.665,49 €	466,34 €	0%	0,15%	0,42%	817,73 €	285.864,48 €	286.682,21 €
396	1.665,49 €	466,34 €	0%	0,15%	0,42%	821,41 €	287.148,55 €	287.969,96 €
397	1.665,49 €	466,34 €	0%	0,15%	0,42%	825,09 €	288.436,30 €	289.261,39 €
398	1.665,49 €	466,34 €	0%	0,15%	0,42%	828,78 €	289.727,73 €	290.556,51 €
399	1.665,49 €	466,34 €	0%	0,15%	0,42%	832,49 €	291.022,85 €	291.855,34 €
400	1.665,49 €	466,34 €	0%	0,15%	0,42%	836,20 €	292.321,67 €	293.157,88 €
401	1.665,49 €	466,34 €	0%	0,15%	0,42%	839,93 €	293.624,22 €	294.464,15 €
402	1.665,49 €	466,34 €	0%	0,15%	0,42%	843,67 €	294.930,49 €	295.774,15 €
403	1.682,15 €	471,00 €	1%	0,15%	0,42%	847,43 €	296.245,15 €	297.092,58 €
404	1.682,15 €	471,00 €	0%	0,15%	0,42%	851,20 €	297.563,58 €	298.414,78 €
405	1.682,15 €	471,00 €	0%	0,15%	0,42%	854,98 €	298.885,78 €	299.740,77 €
406	1.682,15 €	471,00 €	0%	0,15%	0,42%	858,77 €	300.211,77 €	301.070,54 €
407	1.682,15 €	471,00 €	0%	0,15%	0,42%	862,58 €	301.541,54 €	302.404,12 €
408	1.682,15 €	471,00 €	0%	0,15%	0,42%	866,39 €	302.875,12 €	303.741,52 €
409	1.682,15 €	471,00 €	0%	0,15%	0,42%	870,22 €	304.212,52 €	305.082,74 €
410	1.682,15 €	471,00 €	0%	0,15%	0,42%	874,06 €	305.553,74 €	306.427,79 €
411	1.682,15 €	471,00 €	0%	0,15%	0,42%	877,90 €	306.898,79 €	307.776,70 €
412	1.682,15 €	471,00 €	0%	0,15%	0,42%	881,76 €	308.247,70 €	309.129,46 €
413	1.682,15 €	471,00 €	0%	0,15%	0,42%	885,63 €	309.600,46 €	310.486,09 €
414	1.682,15 €	471,00 €	0%	0,15%	0,42%	889,51 €	310.957,10 €	311.846,61 €
415	1.682,15 €	471,00 €	0%	0,15%	0,42%	893,40 €	312.317,61 €	313.211,01 €
416	1.698,97 €	475,71 €	1%	0,15%	0,42%	897,32 €	313.686,72 €	314.584,05 €
417	1.698,97 €	475,71 €	0%	0,15%	0,42%	901,25 €	315.059,76 €	315.961,01 €
418	1.698,97 €	475,71 €	0%	0,15%	0,42%	905,19 €	316.436,72 €	317.341,90 €
419	1.698,97 €	475,71 €	0%	0,15%	0,42%	909,14 €	317.817,61 €	318.726,75 €
420	**1.698,97 €**	**475,71 €**	**0%**	**0,15%**	**0,42%**	**913,10 €**	**319.202,46 €**	**320.115,56 €**
421	1.698,97 €	475,71 €	0%	0,15%	0,42%	917,07 €	320.591,27 €	321.508,35 €
422	1.698,97 €	475,71 €	0%	0,15%	0,42%	921,06 €	321.984,06 €	322.905,11 €
423	1.698,97 €	475,71 €	0%	0,15%	0,42%	925,05 €	323.380,82 €	324.305,87 €
424	1.698,97 €	475,71 €	0%	0,15%	0,42%	929,06 €	324.781,59 €	325.710,64 €
425	1.698,97 €	475,71 €	0%	0,15%	0,42%	933,08 €	326.186,36 €	327.119,43 €
426	1.698,97 €	475,71 €	0%	0,15%	0,42%	937,11 €	327.595,14 €	328.532,25 €
427	1.698,97 €	475,71 €	0%	0,15%	0,42%	941,15 €	329.007,96 €	329.949,11 €
428	1.698,97 €	475,71 €	0%	0,15%	0,42%	945,20 €	330.424,82 €	331.370,02 €
429	1.715,96 €	480,47 €	1%	0,15%	0,42%	949,28 €	331.850,49 €	332.799,77 €
430	1.715,96 €	480,47 €	0%	0,15%	0,42%	953,37 €	333.280,24 €	334.233,61 €
431	1.715,96 €	480,47 €	0%	0,15%	0,42%	957,47 €	334.714,08 €	335.671,55 €
432	1.715,96 €	480,47 €	0%	0,15%	0,42%	961,58 €	336.152,01 €	337.113,60 €
433	1.715,96 €	480,47 €	0%	0,15%	0,42%	965,71 €	337.594,07 €	338.559,78 €
434	1.715,96 €	480,47 €	0%	0,15%	0,42%	969,85 €	339.040,24 €	340.010,09 €
435	1.715,96 €	480,47 €	0%	0,15%	0,42%	973,99 €	340.490,56 €	341.464,55 €
436	1.715,96 €	480,47 €	0%	0,15%	0,42%	978,16 €	341.945,02 €	342.923,18 €
437	1.715,96 €	480,47 €	0%	0,15%	0,42%	982,33 €	343.403,65 €	344.385,97 €
438	1.715,96 €	480,47 €	0%	0,15%	0,42%	986,51 €	344.866,44 €	345.852,95 €
439	1.715,96 €	480,47 €	0%	0,15%	0,42%	990,71 €	346.333,42 €	347.324,13 €
440	1.715,96 €	480,47 €	0%	0,15%	0,42%	994,92 €	347.804,60 €	348.799,52 €
441	1.715,96 €	480,47 €	0%	0,15%	0,42%	999,14 €	349.279,99 €	350.279,12 €
442	1.733,12 €	485,27 €	1%	0,15%	0,42%	1.003,38 €	350.764,40 €	351.767,78 €
443	1.733,12 €	485,27 €	0%	0,15%	0,42%	1.007,64 €	352.253,05 €	353.260,69 €

444	1.733,12 €	485,27 €	0%	0,15%	0,42%	1.011,91 €	353.745,97 €	354.757,88 €
445	1.733,12 €	485,27 €	0%	0,15%	0,42%	1.016,20 €	355.243,15 €	356.259,35 €
446	1.733,12 €	485,27 €	0%	0,15%	0,42%	1.020,49 €	356.744,62 €	357.765,11 €
447	1.733,12 €	485,27 €	0%	0,15%	0,42%	1.024,80 €	358.250,39 €	359.275,18 €
448	1.733,12 €	485,27 €	0%	0,15%	0,42%	1.029,12 €	359.760,46 €	360.789,57 €
449	1.733,12 €	485,27 €	0%	0,15%	0,42%	1.033,45 €	361.274,85 €	362.308,30 €
450	1.733,12 €	485,27 €	0%	0,15%	0,42%	1.037,79 €	362.793,57 €	363.831,36 €
451	1.733,12 €	485,27 €	0%	0,15%	0,42%	1.042,15 €	364.316,64 €	365.358,79 €
452	1.733,12 €	485,27 €	0%	0,15%	0,42%	1.046,52 €	365.844,06 €	366.890,58 €
453	1.733,12 €	485,27 €	0%	0,15%	0,42%	1.050,90 €	367.375,85 €	368.426,76 €
454	1.733,12 €	485,27 €	0%	0,15%	0,42%	1.055,30 €	368.912,03 €	369.967,32 €
455	1.750,45 €	490,13 €	1%	0,15%	0,42%	1.059,72 €	370.457,45 €	371.517,17 €
456	1.750,45 €	490,13 €	0%	0,15%	0,42%	1.064,15 €	372.007,29 €	373.071,44 €
457	1.750,45 €	490,13 €	0%	0,15%	0,42%	1.068,60 €	373.561,57 €	374.630,17 €
458	1.750,45 €	490,13 €	0%	0,15%	0,42%	1.073,06 €	375.120,29 €	376.193,35 €
459	1.750,45 €	490,13 €	0%	0,15%	0,42%	1.077,53 €	376.683,47 €	377.761,00 €
460	1.750,45 €	490,13 €	0%	0,15%	0,42%	1.082,01 €	378.251,13 €	379.333,14 €
461	1.750,45 €	490,13 €	0%	0,15%	0,42%	1.086,51 €	379.823,26 €	380.909,77 €
462	1.750,45 €	490,13 €	0%	0,15%	0,42%	1.091,02 €	381.399,90 €	382.490,92 €
463	1.750,45 €	490,13 €	0%	0,15%	0,42%	1.095,54 €	382.981,04 €	384.076,58 €
464	1.750,45 €	490,13 €	0%	0,15%	0,42%	1.100,08 €	384.566,71 €	385.666,79 €
465	1.750,45 €	490,13 €	0%	0,15%	0,42%	1.104,63 €	386.156,91 €	387.261,54 €
466	1.750,45 €	490,13 €	0%	0,15%	0,42%	1.109,19 €	387.751,66 €	388.860,85 €
467	1.750,45 €	490,13 €	0%	0,15%	0,42%	1.113,76 €	389.350,98 €	390.464,74 €
468	1.767,95 €	495,03 €	1%	0,15%	0,42%	1.118,37 €	390.959,77 €	392.078,13 €
469	1.767,95 €	495,03 €	0%	0,15%	0,42%	1.122,98 €	392.573,16 €	393.696,14 €
470	1.767,95 €	495,03 €	0%	0,15%	0,42%	1.127,61 €	394.191,17 €	395.318,78 €
471	1.767,95 €	495,03 €	0%	0,15%	0,42%	1.132,25 €	395.813,80 €	396.946,05 €
472	1.767,95 €	495,03 €	0%	0,15%	0,42%	1.136,91 €	397.441,08 €	398.577,99 €
473	1.767,95 €	495,03 €	0%	0,15%	0,42%	1.141,57 €	399.073,01 €	400.214,59 €
474	1.767,95 €	495,03 €	0%	0,15%	0,42%	1.146,26 €	400.709,61 €	401.855,87 €
475	1.767,95 €	495,03 €	0%	0,15%	0,42%	1.150,95 €	402.350,90 €	403.501,85 €
476	1.767,95 €	495,03 €	0%	0,15%	0,42%	1.155,66 €	403.996,87 €	405.152,53 €
477	1.767,95 €	495,03 €	0%	0,15%	0,42%	1.160,38 €	405.647,56 €	406.807,94 €
478	1.767,95 €	495,03 €	0%	0,15%	0,42%	1.165,12 €	407.302,97 €	408.468,08 €
479	1.767,95 €	495,03 €	0%	0,15%	0,42%	1.169,86 €	408.963,11 €	410.132,97 €
480	**1.767,95 €**	**495,03 €**	**0%**	**0,15%**	**0,42%**	**1.174,63 €**	**410.628,00 €**	**411.802,63 €**
481	1.785,63 €	499,98 €	1%	0,15%	0,42%	1.179,42 €	412.302,61 €	413.482,02 €
482	1.785,63 €	499,98 €	0%	0,15%	0,42%	1.184,22 €	413.982,00 €	415.166,22 €
483	1.785,63 €	499,98 €	0%	0,15%	0,42%	1.189,04 €	415.666,20 €	416.855,24 €
484	1.785,63 €	499,98 €	0%	0,15%	0,42%	1.193,87 €	417.355,22 €	418.549,09 €
485	1.785,63 €	499,98 €	0%	0,15%	0,42%	1.198,72 €	419.049,07 €	420.247,78 €
486	1.785,63 €	499,98 €	0%	0,15%	0,42%	1.203,58 €	420.747,76 €	421.951,33 €
487	1.785,63 €	499,98 €	0%	0,15%	0,42%	1.208,45 €	422.451,31 €	423.659,76 €
488	1.785,63 €	499,98 €	0%	0,15%	0,42%	1.213,34 €	424.159,74 €	425.373,07 €
489	1.785,63 €	499,98 €	0%	0,15%	0,42%	1.218,24 €	425.873,05 €	427.091,29 €
490	1.785,63 €	499,98 €	0%	0,15%	0,42%	1.223,15 €	427.591,26 €	428.814,42 €
491	1.785,63 €	499,98 €	0%	0,15%	0,42%	1.228,08 €	429.314,39 €	430.542,48 €
492	1.785,63 €	499,98 €	0%	0,15%	0,42%	1.233,02 €	431.042,45 €	432.275,48 €
493	1.785,63 €	499,98 €	0%	0,15%	0,42%	1.237,98 €	432.775,45 €	434.013,44 €
494	1.803,49 €	504,98 €	1%	0,15%	0,42%	1.242,97 €	434.518,41 €	435.761,38 €
495	1.803,49 €	504,98 €	0%	0,15%	0,42%	1.247,97 €	436.266,36 €	437.514,32 €
496	1.803,49 €	504,98 €	0%	0,15%	0,42%	1.252,98 €	438.019,30 €	439.272,28 €
497	1.803,49 €	504,98 €	0%	0,15%	0,42%	1.258,01 €	439.777,26 €	441.035,27 €
498	1.803,49 €	504,98 €	0%	0,15%	0,42%	1.263,05 €	441.540,25 €	442.803,30 €
499	1.803,49 €	504,98 €	0%	0,15%	0,42%	1.268,11 €	443.308,28 €	444.576,39 €

500	1.803,49 €	504,98 €	0%	0,15%	0,42%	1.273,18 €	445.081,37 €	446.354,55 €
501	1.803,49 €	504,98 €	0%	0,15%	0,42%	1.278,27 €	446.859,53 €	448.137,80 €
502	1.803,49 €	504,98 €	0%	0,15%	0,42%	1.283,37 €	448.642,78 €	449.926,15 €
503	1.803,49 €	504,98 €	0%	0,15%	0,42%	1.288,49 €	450.431,12 €	451.719,61 €
504	1.803,49 €	504,98 €	0%	0,15%	0,42%	1.293,62 €	452.224,59 €	453.518,20 €
505	1.803,49 €	504,98 €	0%	0,15%	0,42%	1.298,76 €	454.023,18 €	455.321,94 €
506	1.803,49 €	504,98 €	0%	0,15%	0,42%	1.303,92 €	455.826,92 €	457.130,84 €
507	1.821,52 €	510,03 €	1%	0,15%	0,42%	1.309,11 €	457.640,87 €	458.949,98 €
508	1.821,52 €	510,03 €	0%	0,15%	0,42%	1.314,31 €	459.460,01 €	460.774,32 €
509	1.821,52 €	510,03 €	0%	0,15%	0,42%	1.319,53 €	461.284,35 €	462.603,88 €
510	1.821,52 €	510,03 €	0%	0,15%	0,42%	1.324,77 €	463.113,91 €	464.438,67 €
511	1.821,52 €	510,03 €	0%	0,15%	0,42%	1.330,02 €	464.948,70 €	466.278,72 €
512	1.821,52 €	510,03 €	0%	0,15%	0,42%	1.335,28 €	466.788,74 €	468.124,02 €
513	1.821,52 €	510,03 €	0%	0,15%	0,42%	1.340,56 €	468.634,05 €	469.974,61 €
514	1.821,52 €	510,03 €	0%	0,15%	0,42%	1.345,85 €	470.484,63 €	471.830,48 €
515	1.821,52 €	510,03 €	0%	0,15%	0,42%	1.351,16 €	472.340,51 €	473.691,67 €
516	1.821,52 €	510,03 €	0%	0,15%	0,42%	1.356,48 €	474.201,70 €	475.558,18 €
517	1.821,52 €	510,03 €	0%	0,15%	0,42%	1.361,82 €	476.068,21 €	477.430,03 €
518	1.821,52 €	510,03 €	0%	0,15%	0,42%	1.367,18 €	477.940,06 €	479.307,24 €
519	1.821,52 €	510,03 €	0%	0,15%	0,42%	1.372,55 €	479.817,26 €	481.189,81 €
520	1.839,74 €	515,13 €	1%	0,15%	0,42%	1.377,95 €	481.704,94 €	483.082,89 €
521	1.839,74 €	515,13 €	0%	0,15%	0,42%	1.383,36 €	483.598,01 €	484.981,38 €
522	1.839,74 €	515,13 €	0%	0,15%	0,42%	1.388,79 €	485.496,50 €	486.885,30 €
523	1.839,74 €	515,13 €	0%	0,15%	0,42%	1.394,24 €	487.400,42 €	488.794,66 €
524	1.839,74 €	515,13 €	0%	0,15%	0,42%	1.399,70 €	489.309,79 €	490.709,49 €
525	1.839,74 €	515,13 €	0%	0,15%	0,42%	1.405,18 €	491.224,62 €	492.629,80 €
526	1.839,74 €	515,13 €	0%	0,15%	0,42%	1.410,67 €	493.144,93 €	494.555,60 €
527	1.839,74 €	515,13 €	0%	0,15%	0,42%	1.416,18 €	495.070,72 €	496.486,91 €
528	1.839,74 €	515,13 €	0%	0,15%	0,42%	1.421,71 €	497.002,03 €	498.423,74 €
529	1.839,74 €	515,13 €	0%	0,15%	0,42%	1.427,25 €	498.938,87 €	500.366,11 €
530	1.839,74 €	515,13 €	0%	0,15%	0,42%	1.432,80 €	500.881,24 €	502.314,04 €
531	1.839,74 €	515,13 €	0%	0,15%	0,42%	1.438,37 €	502.829,17 €	504.267,54 €
532	1.839,74 €	515,13 €	0%	0,15%	0,42%	1.443,96 €	504.782,67 €	506.226,63 €
533	1.858,14 €	520,28 €	1%	0,15%	0,42%	1.449,58 €	506.746,91 €	508.196,49 €
534	1.858,14 €	520,28 €	0%	0,15%	0,42%	1.455,22 €	508.716,77 €	510.171,99 €
535	1.858,14 €	520,28 €	0%	0,15%	0,42%	1.460,87 €	510.692,27 €	512.153,13 €
536	1.858,14 €	520,28 €	0%	0,15%	0,42%	1.466,53 €	512.673,41 €	514.139,95 €
537	1.858,14 €	520,28 €	0%	0,15%	0,42%	1.472,22 €	514.660,23 €	516.132,44 €
538	1.858,14 €	520,28 €	0%	0,15%	0,42%	1.477,92 €	516.652,72 €	518.130,64 €
539	1.858,14 €	520,28 €	0%	0,15%	0,42%	1.483,63 €	518.650,92 €	520.134,55 €
540	1.858,14 €	520,28 €	0%	0,15%	0,42%	1.489,37 €	520.654,83 €	522.144,20 €

Where BMR stands for Bond Market Return and SMR stands for Stock Market Return, the following formula was usd to calculate the postecipated rent:

1) $\text{Monthly Pension} = \frac{\frac{Final\ Capital * Monthly\ Interest\ rate}{1+(Monthly\ Interest\ rate)\text{^}(-Number\ of\ Months)}}{(1+Monthly\ Interest\ rate)}$

Period	Initial Salary	Initial Contr	Monthly Return	Total Capital	Final Pension	Last Salary
45 years	1.235,67 €	345,99 €	0,29%	522.144,20 €	3.001,61 €	1.858,14 €
40 years	1.235,67 €	345,99 €	0,29%	411.802,63 €	2.367,30 €	1.767,95 €
35 years	1.235,67 €	345,99 €	0,29%	320.115,56 €	1.840,22 €	1.698,97 €
30 years	1.235,67 €	345,99 €	0,29%	244.066,00 €	1.403,04 €	1.616,51 €
25 years	1.235,67 €	345,99 €	0,29%	181.145,22 €	1.041,33 €	1.616,51 €